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Connecticut's Billion Dollar Bet

Will The Largest
Government IT
Outsourcing
Deal In History
Fly Or Flop?

PAGE 32

CIO Rock Regan and
Gov. John Rowland (seated)
think outsourcing is
a capital idea

ALSO INSIDE

The Bargain Hunter's
Guide To Global Networks

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Is Your State Ready
For Y2K?

PAGE 40

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SECTION 1

Features

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COVER STORY: OUTSOURCING Will Connecticut be the first state to outsource all its core IT systems? While the governor and the CIO think it's a sure thing, a lot of people call it a long shot.

By Tom Field

40 States of Readiness

YEAR 2000 CHALLENGE CIO looks at the 50 states and how they stack up in the race for Y2K compliance.

By Howard Baldwin

50 The Bargain Hunter's Guide to Global Networking

VIRTUAL PRIVATE NETWORKS If you think VPNs are just for small businesses, think again. A surprising number of billion-dollar businesses are using the technology to extend their presence around the globe—and saving a bundle.

By Polly Schneider



ON THE COVER

Can Connecticut **succeed**
where **other** states have **failed**?

Cover photo by Tracey Kroll



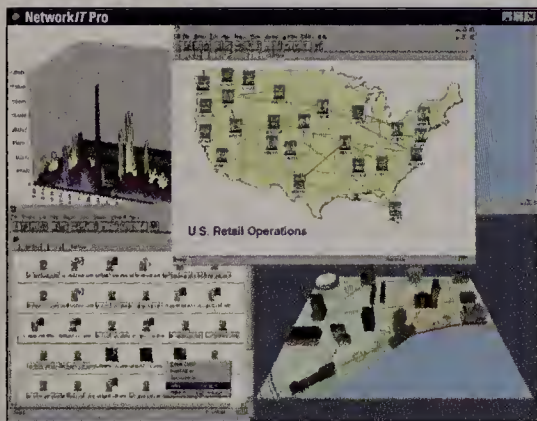
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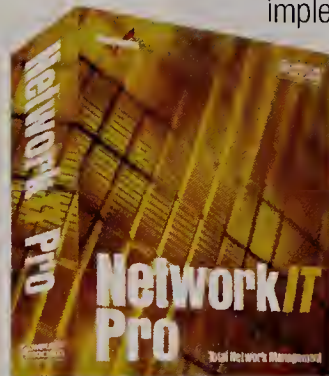
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you get results. Together, we can move forward
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THINK TANK We continue to gather more and more information, but what are we doing with it?

By Tom Davenport

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FINE PRINT Vendors and integrators like to dump hardware sizing risk in the CIO's lap. Don't let them.

By Wayne D. Bennett

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EMERGING TECHNOLOGY With these new solutions, you can kick-start your HR software's capabilities.

By Alan S. Kay

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By David Pearson

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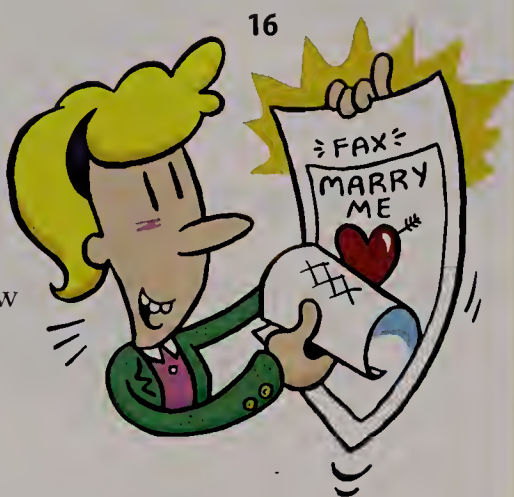
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COVER STORY: EXECUTIVE OFFICES

Some CIOs think it's time for corporate America to anoint the Chief Web Officer. We asked six experts if they agreed.

USABILITY A bad design can cost a Web site 40 percent of repeat traffic. A good design can keep them coming back. A few tests can make the difference.

KNOWLEDGE MANAGEMENT Bay Networks spent \$3 million and two years studying the different ways people think about the same thing. They all think alike about the \$10 million saved each year.

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POWER SOURCE Cable modems and ADSL propel high-speed Internet access from wishful thinking to reality—but create new headaches as well.

BACK TALK John Hagel—Defend or attack?



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In Box

LETTER FROM THE EDITOR AND HOW TO REACH US

The world in which CIOs live and work is full of hazards. With annual budgets in the millions, everyone wants a piece of your pie. The complexity of the deals being inked for the provision of IT products and services is enough to make a CIO weak at the knees.

There are other perils as well: the legalities of electronic commerce, the protection of consumer information, international privacy laws and new commercial regulations that favor vendors and leave CIOs swinging in the breeze. Do you know where the gotchas are?

Wayne Bennett does. He's a partner at the Boston-based law firm Bingham Dana LLP. As chair of Bingham Dana's Commercial Technology Practice Area, Wayne brokers lots of fat deals between vendors and CIOs, sometimes representing the buyer, sometimes the seller. He's got the real skinny on current and emerging legal issues; he understands and can interpret the fine print. And he

wants to share his insider knowledge with you.

We at *CIO* know how important it is for IS executives to understand this arcana. We also know what a joke it is to think you have time to immerse yourself in such an overwhelming body of knowledge. So we've asked Wayne to boil it down for you—to lift the veil on the ins and outs of technology law and justice; select the most relevant, pressing issues; and tell you what you need to know (and why you need to know it).

Now as you might imagine, Wayne's a busy guy—not much time for journalistic endeavors. In fact, we had to beseech him for a half-dozen columns a year. He makes his Fine Print column debut in this issue (see "Hot Potato," Page 56), writing about how not to get stuck with hardware sizing risk. Let him know what you think of the column by sending an e-mail to fineprint@cio.com. Is it on target with what you need to know? And if there are any particular issues that you'd like his perspective on, send him your questions and he'll address them in future columns.

Because as the tagline on the column says, what you don't know really can hurt you.

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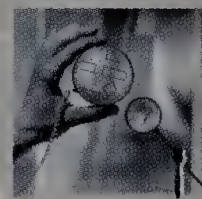
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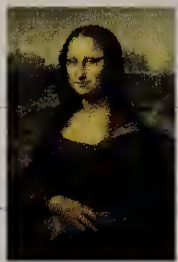
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Publisher's Note

Are you tired of software vendors sending you service packs to fix bugs that should have been stamped out earlier? Off-the-shelf commercial software isn't good enough anymore. Service packs, indeed! Many CIOs I've talked to call them disservice packs.



But do CIOs have a responsibility to help vendors develop better software? "I'm the customer, not a software designer," you may say. And that's where you are wrong. TRW Inc. estimates eradicating a software bug costs over \$1,500. The price to fix that same bug in development is around \$50. CIOs and their staff need to work more closely with software vendors.

With this column I am calling for the formation of the National Enterprise

Software Certification program. As a first step I need corporate users, software vendors and value-added resellers to help me develop a rigorous certification program that would assess a participant's knowledge of operating systems, programming languages, Internet protocols and messaging platforms.

Current certification programs are too vertical. The National Enterprise Software Certification program will focus on multioperating systems, multi-programming languages, and multimessaging and Internet protocol platforms. In other words, the real world of CIOs.

With technology developing so rapidly, a National Enterprise Software Certificate would be good for five years. I see the program being run by a national nonprofit organization jointly funded by end users, software vendors and value-added resellers.

Does our industry need this program? Would you be interested in helping me launch it? I look forward to hearing from you.

Gary J. Beach

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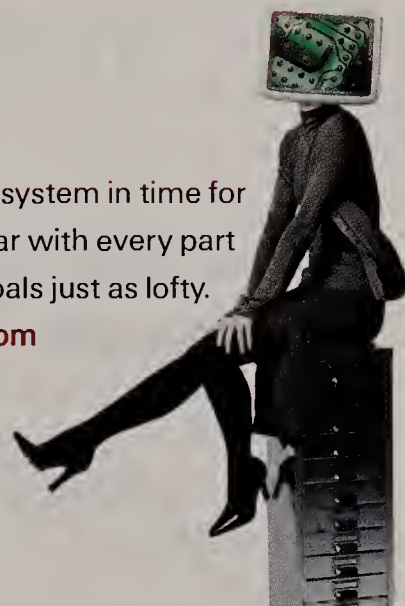
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Trendlines

NEWS, INSIGHT, HUMOR, REVIEWS

Edited by Katherine Noyes

Sounding Off

MILITARY CADENCES Do you long for a way to motivate your staff and inspire teamwork? Are you tired of the traditional approaches like team T-shirts or special outings? You might try having them sing some military marching songs. But be warned: In today's age of political correctness, you'll have to choose carefully.

Indeed, military cadences, the ditties soldiers chant while marching or running, have become a serious problem. Some of them (OK, a lot of them) are offensive. They're insensitive, macho and violent. Right now, for example, young people drilling on bases all over the land are bellowing cadences such as: "A little bird / with a little beak / was sitting on my toilet seat / I pushed him in / I flushed him down / I watched his ass / go round and round." Many of these cadences come from a time when one such as "Two brass balls / and a cast-iron rod / I'm a mean devil dog / a Marine, by God" was unlikely to fall upon the wrong (read



female) ears.

Today, fortunately, help is at hand. The JML Ventures Co. of Big Lake, Minn., which bills itself as a socially responsible research and development company, has produced two tapes of politically correct cadences. Now

our young men and women can train while chanting "Jesse James said before he died / there's five things he wanted to ride / a bicycle, tricycle, automobile / a bow-legged horse and a Ferris wheel." (Just imagine what that one might have sounded like in less enlightened times.)

The tapes cost \$7.95 each and are available in a boxed set. If you think you might like to pick some up for your staff (they're also excellent for pumping yourself up on the drive to work), visit www.jmlventures.com/moderncadence/index.html.

And that's the facts, Jack. ■

Say What?

PLAIN LANGUAGE INITIATIVE It's hard to serve your customers well when they can't understand what the heck you're telling them. Or so, at least, a number of companies have determined. Their answer? The plain language initiative.

We've all been bugged and baffled by documents such as utility bills, bank and brokerage statements, tax forms, insurance policies and college loan applications. Vague information and inscrutable prose often make such communications impenetrable. The solution? "Simplified communications," with short sentences, everyday vocabulary and tailored information.

Siegel & Gale Inc. is a New York City-based branding and communications firm that helps companies revamp their communications for better customer service. Irene Etzkorn, executive vice president of Siegel & Gale and director of its Simplified Communications Group, offers the following example from a health insurer's group enrollment agreement:

Original: "The premium due date is the last business day of the month preceding the month of coverage. The Group agrees to remit, on or before the premium due date, the applicable total monthly

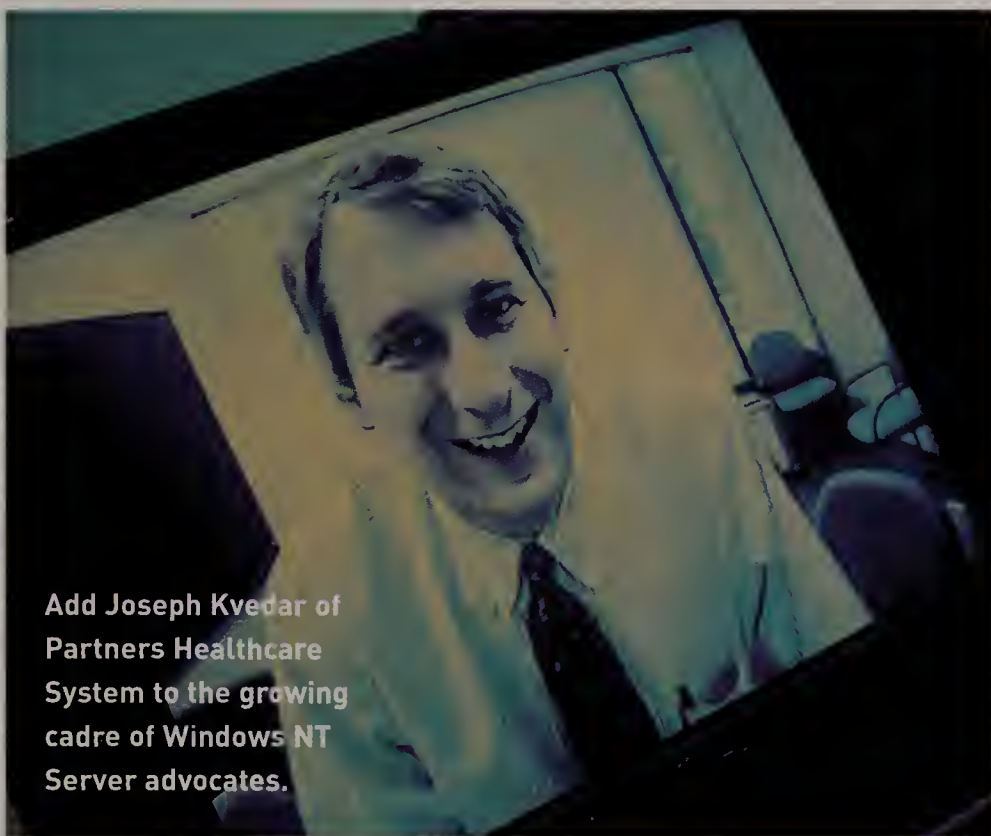
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ARE YOU GETTING WHAT YOU **NEED** FROM YOUR NETWORK OPERATING SYSTEM



Add Joseph Kvedar of Partners Healthcare System to the growing cadre of Windows NT Server advocates.

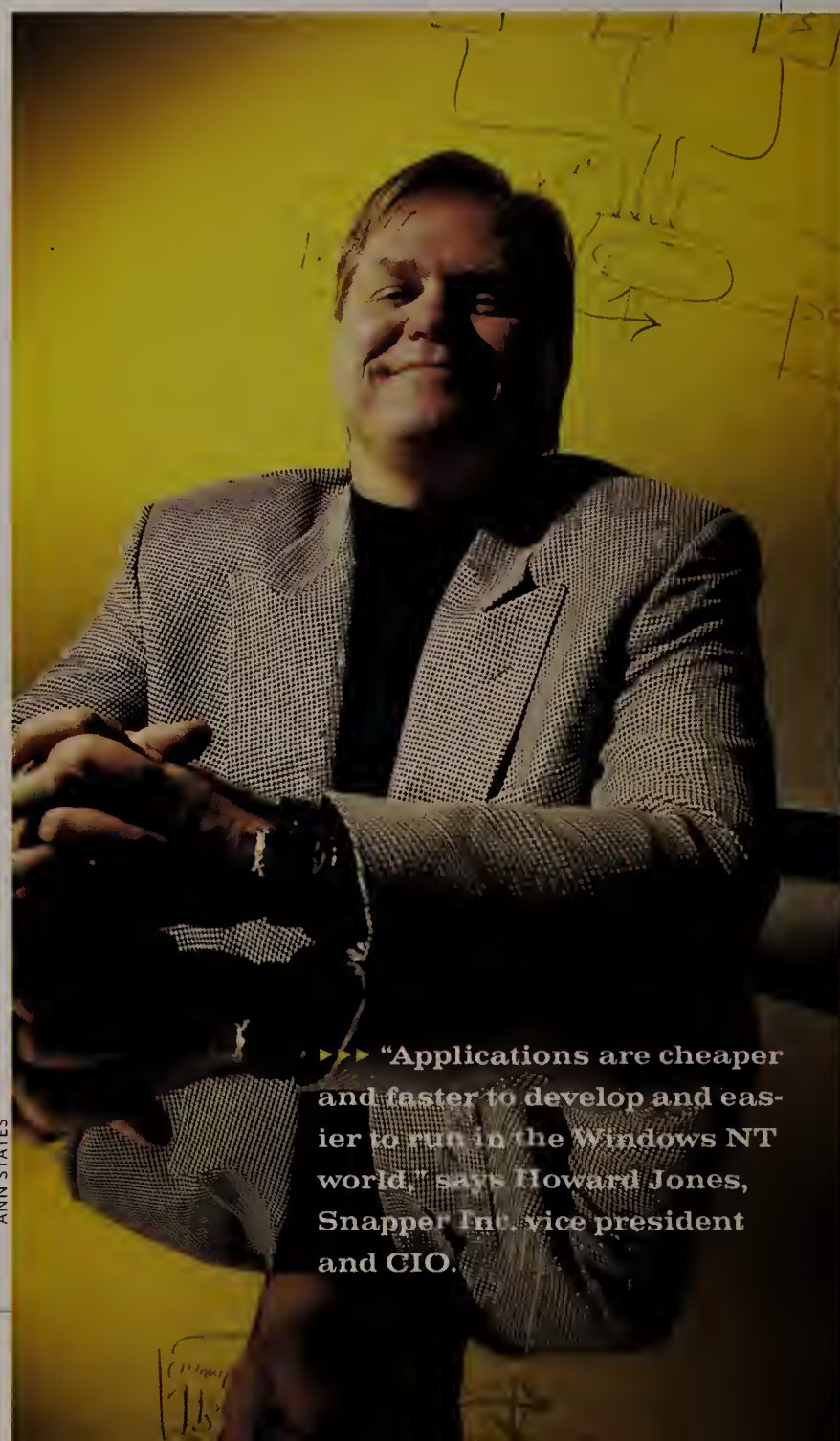
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ARE YOU GETTING WHAT YOU **NEED** FROM YOUR NETWORK OPERATING SYSTEM?

Productivity soars when an OS goes beyond the basics and includes the full range of networking services

Snapper Inc., a midsize manufacturer that produces 120 different lawn products from its plant in McDonough, Ga., knows IT operating systems. It has experience with the IBM AS/400s, Novell NetWare, and Microsoft® Windows NT® Server. But when it came time to determine a platform for a critical sales force automation application that needed to integrate with a wide range of back-end systems, the company chose Windows NT Server without hesitation. "Applications are cheaper and faster to develop and easier to run in the Windows NT world," explains Howard Jones, Snapper Inc.



▶▶▶ "Applications are cheaper and faster to develop and easier to run in the Windows NT world," says Howard Jones, Snapper Inc. vice president and CIO.

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vice president and CIO.

A year ago Adaptec Inc. found itself wrestling with too many network servers. At its Milpitas, Calif., headquarters alone, it had over 75 NetWare servers providing file and print services as well as basic application and database services. Each NetWare-based application required its own server due to reliability issues, and the number of support administrators kept growing. By switching to Windows NT Server 4.0, Adaptec can run multiple applications and databases on

connected to the LAN. They want to use rich, new types of information, such as IP-based telephony and audio and video. And, they want to leverage existing systems to provide strategic advantages. At the same time, they want to ensure a smooth migration to a more open, flexible infrastructure—one where servers can be re-purposed as needed. And IT, business managers insist, must provide it all in a way that ensures security and reliability.

At the same time, global com-

tem, such as Microsoft Windows NT Server. Multi-purpose operating systems incorporate a range of functionality: file and print serving, application services, Web services, communications, and more, observes Jean Bozman, software analyst, International Data Corp. (IDC), Framingham, Mass. But the value goes beyond functionality; multi-purpose operating systems like Windows NT Server also integrate the functionality with a set of management tools and services and a common directory that en-

sures that the result is far greater than the sum of the parts.

In response, IT managers at midsize companies are looking to consolidate and

standardize. "You want to have uniform, consistent capabilities, which is how you can control cost of ownership," advises Brian Connelly, CEO, Enterprise Communication Messaging Solutions (ECMS), Inc., Columbia, S.C., the systems consultant that developed the Snapper sales force automation solution. With uniform, consistent behavior across all systems, applications can be built faster and cheaper, fewer administrators are required, and training is reduced. You also achieve easier, more complete interoperability.

By switching to Windows NT Server, for example, Adaptec not only was able to reduce the number of administrators by about 30%, but each administrator "could do much more than administer a server," Fernandes explains. Because the operations are GUI-based, administration is easy and consistent across services, which allows Adaptec's server administrators to also handle the databases and the applications.

→ Continued on page 8

"There is no question that reducing the number of operating systems can lower costs." -Jamie Lewis, president, Burton Group

the same server platform and consolidate its file and print services without compromising reliable file and print, reports Ryan Fernandes, Adaptec network operation manager.

As Adaptec and Snapper have discovered, in today's complex and high-pressure IT environments, anything easier, faster, and less expensive will be welcomed. Where one technology can do the job of two or three, and do it as well or better, it is sure to be embraced by IT groups, especially midsize ones that may lack specialized resources.

THE BIG SQUEEZE

Organizations today find themselves increasingly squeezed. Business users are demanding more IT services and capabilities. They want reliable and fast file and print sharing, as usual, but they also want email and messaging. They want rich standards-based intranet solutions and database applications that are as easily accessible by remote users as by employees

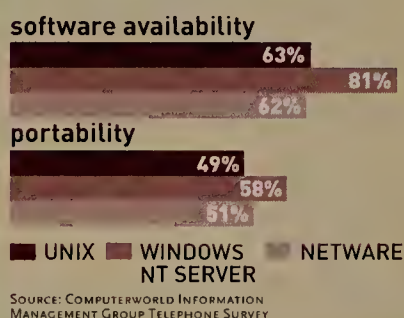
petition is forcing organizations to cut costs. The IT group is under the gun to do more with less, and reduce the cost of ownership. Midsize organizations, for example, no longer can maintain multiple IT platforms and train different sets of administrators. As a result, every aspect of the IT function is open to question: training, the number of administrators, the mix of vendors and platforms, and more.

DOING MORE

Key to controlling costs while delivering the enhanced IT services is the multi-purpose operating sys-

WINDOWS NT COMES UP STRONG

Below are percentages of IT managers who said their OS platform rated good or very good in these criteria.



YEAR OF THE RAS-VPN

Windows NT Server delivers open communication

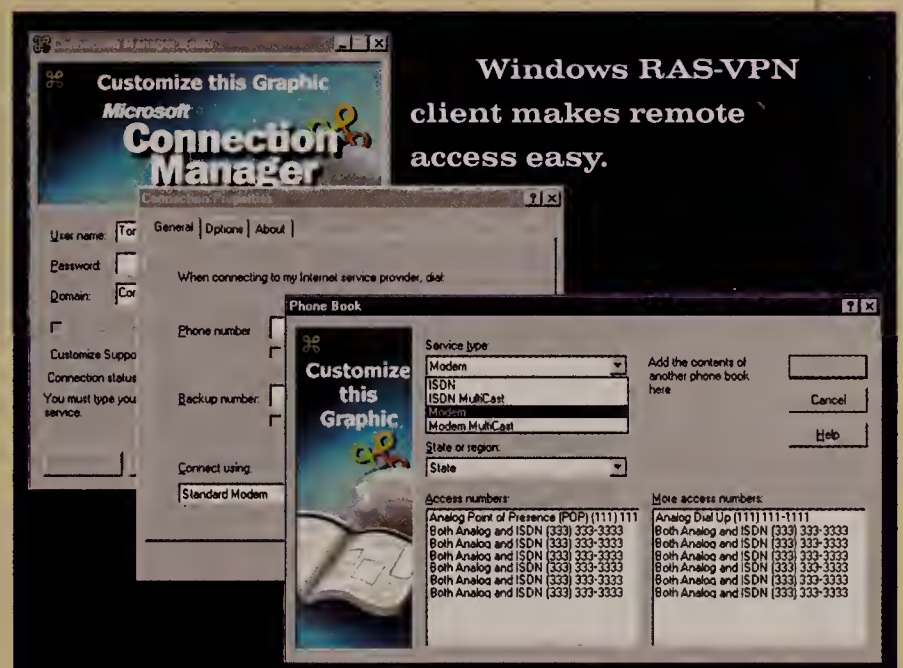
To work effectively, people need to communicate and access information easily and efficiently. With the advent of the Internet and e-commerce, organizations need open, flexible, interoperable solutions — not the proprietary point solutions of the past.

Today, open systems — server-based systems that allow organizations to pick and choose among a wide choice of diverse yet interoperable hardware and software products — are enabling companies to change the way they build and manage voice and data networks. Citing a second generation of products and falling prices, IDC projects the RAS (remote access services) market to exceed \$700 million, reflecting a 51 percent CAGR since 1998.

Windows NT Server is the open systems platform for a new generation of simpler, more affordable communications. Organizations today dramatically reduce costs, and increase productivity, by connecting telecommuters, mobile employees, satellite offices, and extranet partners with Windows NT. Windows NT Routing and Remote Access Service and VPN (virtual private network) capabilities facilitate remote access management. Using the Internet and direct private-line connections, Windows customers can easily deploy integrated networking solutions that optimize their application and security needs in the most efficient way possible. According to Infonetics Research, San Jose, Calif., the number one remote access strategy for companies is to deploy a combination VPN/direct-dial service.

Windows NT Server is also helping to dramatically reduce remote access deployment costs with the Connection Manager Administration Kit (available in the Windows NT Option Pack). Using this tool, organizations can centrally configure and deploy single sign-on remote access clients for direct-dial and VPN. Windows NT Server's centrally managed phonebooks ensure these clients can easily access up-to-date local RAS or VPN dial-up phone numbers to make least-cost connections. "By building in and integrating secure VPN, routing, and direct-dial services, we make connecting users and offices easy and safe to use," explains Microsoft's Mike Nash.

Windows NT Server, IDC reports, currently can



Windows RAS-VPN client makes remote access easy.

support hundreds of simultaneous RAS users and Windows load balancing services, and embedded solutions promise even more scalable VPN services. Windows 2000, IDC adds, will handle significantly more simultaneous RAS users.

HIGH-TECH HOTEL Organizations of all sizes are capitalizing on the integrated communications services of Windows NT Server and innovative network-aware applications. For example, using a Windows NT-based solution, the San Jose Hyatt hotel was able to extend to its high-tech clientele fast, easy, and secure high-speed access to the Internet so they can be more productive while on the road.

The hotel's primary business customer is laptop equipped and travels frequently to Silicon Valley. Through Windows NT Server and San Diego-based ATCOM/INFO's IPORT secure, reliable, public Internet access solution, the hotel is able to provide information and high-speed Internet connectivity in more than 250 of its rooms. The service makes available high-speed Internet links for guests to use to connect to their company networks with Windows VPN services. "Since we turned it on last April, we've experienced steadily increasing usage," reports Jeffrey Burg, executive assistant manager. Now the hotel is looking at more integrated application services it can provide to better service its high-tech clientele with Windows NT Server.

COMPAQ AND MICROSOFT: BETTER PARTNERSHIPS= BETTER SOLUTIONS= BETTER ANSWERS FOR CUSTOMERS

CIOs and IT managers today are faced with some pretty tough questions:

- ▶ "How do I demonstrate IT business value?"
- ▶ "How do I ensure secure network access from anywhere, anytime?"
- ▶ "How do I create a flexible, scalable IT infrastructure?"
- ▶ "How do I manage my heterogeneous network?"

Many organizations have already selected Windows NT Server to meet their computing needs.. With any server deployment comes risk – risks of mis-planning for a growing business' needs, risks of inefficient deployments, and risks of complex and costly operations. How does IT management minimize these risks? Wise choices.

WHAT'S HARDWARE GOT TO DO WITH IT?

Does hardware make a difference in deploying Windows NT servers? You bet it does. Deploying a scalable and highly available Server requires a reliable, standards-based hardware platform that helps customers to achieve and sustain competitive advantage, achieve quicker return on their server investment as well as reduce complexity and costs in their IT environment.

Not every hardware vendor is equipped to deliver the kind of performance. Compaq's long-standing partnership and history with Microsoft ensures that both, the server software and hardware are stress-tested, co-engineered and fully optimized for highest performance and reliability. Compaq ProLiant represents the most stable computing environment for running Windows NT based Networking and Application Servers.

There are four main factors that make Compaq ProLiant the platform of choice for Windows NT Server deployments: Fruits of the Frontline Partnership, Shared Commitment to Reducing Complexity, Engineering Excellence and Value-Added Services.

THE PROOF IS IN THE PARTNERSHIP

Compaq's close alliance with Microsoft strengthens its ability to support Windows NT Server deployments

with minimum risk and maximum cost effectiveness. Compaq has more hands-on, real-world experience with



Windows NT Server than anyone else in the industry. In the past 4 years, Compaq has helped over 3 million users migrate from a multitude of environments to Windows NT. In fact, Microsoft recently named Compaq the first worldwide Prime Integrator for Windows NT.

Compaq has fostered a close relationship with Microsoft for over 15 years

– dating back to 1983, formalized as the Frontline Partnership in 1993. This partnership has provided customers a superior Windows NT server platform that is simple to install, easy to use, and provides excellent value and performance.

The simple reason that the Compaq/Microsoft combination has won over so many customers is that it simply works better and more reliable than competitive solutions. From simplifying installation, to being able to accurately configure the solution, to operating with peak performance, Compaq ProLiant/Windows NT-based solutions make IT management's task easier, the customer's business more productive – and ultimately, through increased uptime and decreased costs of ownership – more profitable.

COMMITMENT TO SIMPLIFICATION

Compaq and Microsoft alike recognize that deploying enterprise-class networks and applications is often a complex, time and resource-straining task for customers. With a co-commitment to simplifying the planning, deployment, and operation of Windows NT-based networks and solutions, Compaq provides expertise and smart tools that enable customers to re-

duce complexity, save time and resources over the life of the server and continues to deliver customer-driven innovations that address key challenges in the IT environment.

Compaq ActiveAnswers for example is the industry's leading online destination for enterprise computing solutions and services. ActiveAnswers serves as a information hub for resellers, VARs, solutions integrators, consultants, ISPs, Web developers and self-integrating companies to gain

access to over 40 jointly developed and fully tested solution areas.

Microsoft is one of Compaq's premier ISV partners participating in the co-development of ActiveAnswers. Today, users can gain access to ActiveAnswers for Microsoft Windows NT Server 4.0, where they will find proven methods and best practices for developing and deploying Windows NT 4.0 based networking platforms, as well as ActiveAnswers for various Microsoft Solutions like MicrosoftExchange, Microsoft Site Server, and Microsoft Internet Information Server.

ENGINEERING EXCELLENCE

Compaq and Microsoft engage in many co-engineering and testing efforts including benchmarking, architecture development, and developing lifecycle enhancers.

The Compaq ProLiant family of servers has made headlines for its technological innovations with Fibre Channel, HotPlug PCI, its SmartStart installation tools and

available sizing and configuration tools for Windows NT Server based solutions. Combining Compaq ProLiant with Windows NT delivers customers the most optimized platform for networking infrastructure as well as application server deployments.

ENHANCING SOLUTIONS WITH SERVICES

One of the crown jewels of Compaq today is its Services Organization. Its portfolio of customer-proven services features Windows NT-related offerings including: Enterprise Windows NT Services, Microsoft

"Compaq and Microsoft work together at a fundamental level to provide the highest possible levels of integration, reliability and performance. The Frontline Partnership works for our customers."

— Eckhard Pfeiffer, President and CEO, Compaq Corporation

Exchange Services, Internet/Intranet Services, Financial Services Industry Solutions, Intelligent Network Service Solutions, Lifecycle Services, Support Services for Windows NT and High Availability Services.

Compaq Services boasts more Microsoft Certified Solution Developers (MCSDs) and Microsoft Certified Solution Engineers (MCSEs) than any other vendor combined. MCSE and MCSD represent the highest certification level for Microsoft technologies, and Compaq currently has over 2,200 professionals certified at this level and will add 1,000 more by the end of 1999.

WHAT'S NEXT FOR THE COMPAQ WINDOWS NT SERVER PLATFORM?

1999 presents a unique balancing-act challenge for CIOs and IT managers – as they address questions about network management, scalability, reliability, and reducing TCO, they also face the additional question of "Will our organization be Y2K resilient?" After the Y2K milestone comes and goes, attention will refocus on creating the web-enabled enterprise. As the demand for multi-dimensional and inter-connected supply chains increases, enterprise customers will turn more and more to the Internet extending their networks into "business ecosystems." The flexibility and robust nature of Windows NT provides the digital nervous system for bringing these ecosystems to life. Together as business partners, Compaq and Microsoft will continue to work to make these ecosystems interoperable, secure, manageable – and affordable. That's what the Compaq and Microsoft partnership is all about – delivering best of class enterprise solutions to customers worldwide.

COMPAQ

THE COMPAQ AND WINDOWS NT SERVER 4.0 ADVANTAGE:

<http://www.compaq.com/partners/microsoft/products/nt4desc.html>

COMPAQ ACTIVEANSWERS FOR NT SERVER 4.0:

http://www.compaq.com/activeanswers/about/info_winnt.html

COMPAQ/MICROSOFT FRONTLINE PARTNERSHIP:

<http://www.compaq.com/partners/microsoft/about/index.html>

COMPAQ PROLIANT SERVER INFORMATION:

<http://www.compaq.com/products/servers/>

DID YOU KNOW?

- Compaq commands the clear lead in the NT server market with more than twice the volume of the nearest competitor...
- Compaq and Microsoft were the first vendors to break the \$20/tpmC barrier with the most recent ProLiant 7000 / Windows NT 4.0 TPC-C benchmark.1
- In the past four years, Compaq helped over 3-million users to migrate from other NOS environments to Windows NT...
- Compaq has nearly 4 million seats of Microsoft Exchange under deployment contract

← Continued from page 4

"We are getting more bang from our administrators," he reports.

In the past, IT has turned to specialized operating systems to perform different functions. This came about because of the limitations of the technology at the time, particularly PCs. "A PC with a 386 processor simply couldn't run big databases or applications, which is a key requirement for serious business servers," explains Mike Nash,

operability and efficient, effective administration and management.

WINDOWS NT SERVER DELIVERS BENEFITS

As its term implies, the multi-purpose operating system includes a range of capabilities. Ideally, the multi-purpose OS will allow the organization to easily enable or disable particular functionality as dictated by the organization's situation, explains Jamie Lewis, pres-

cess services.

► Integrates advanced features such as virtual private networking and streaming media.

► Provides efficient management and administration, with enhanced hierarchical directory support coming shortly.

► Offers a robust, tightly integrated security model that delivers complete security through a single, efficient security process.

► And all of these features come wrapped with an integrated set of services that enable organizations to efficiently administer their open, distributed systems environment.

"Windows NT is already a requirement for success among virtually all industry vendors." - International Data Corp.

director, Windows® Server and Infrastructure Product Marketing Group at Microsoft. Organizations that needed sophisticated application or database serving were forced to buy RISC-based hardware running Unix and operate it alongside their PCs.

Suddenly organizations were running three or more operating systems and deploying dedicated proprietary point solutions. This created headaches for the IT group, requiring them to hire and train administrators for each OS, and to try to forge some level of interoperability between platforms.

"In the 1980s it was all we could do to knit PCs together. In the 1990s, we want better interoperability. We also want more capabilities, including integrated Internet," IDC's Bozeman notes, explaining the evolution from network operating systems that simply allowed organizations to tie together PCs to today's multi-purpose operating systems that integrate a wide range of functionality. Moving forward, organizations will not only want that range of functionality but seamless inter-

operability and efficient, effective administration and management. This reduces the investment risk while providing the power and scalability of dedicated servers.

Windows NT Server offers the kind of multi-purpose capabilities once associated with more costly and often proprietary platforms. Highly modular, Windows NT Server enables midsize organizations to pick and choose functionality and add new functionality as needed. Specifically, Windows NT Server:

► Provides fast and reliable file and print.

► Handles sophisticated applications and complex relational databases.

► Offers Web application services, as well as advanced communications with integrated remote ac-

cess services. Ultimately, the payoff from the multi-purpose operating system is more effective computing. "There is no question that reducing the number of operating systems can lower costs," says Lewis.

The lower costs are achieved through savings that result from the simplified, consolidated computing environment due to advanced, tightly integrated functionality and consistent security. This allows IT groups to redirect administrators toward higher value work. Adaptec, for example, cut more than 30 servers as well as re-deployed its administrative staff. Particularly for smaller and mid-size companies, Lewis concludes, "the multi-purpose operating system will become more important."

Over the past several years,

WINDOWS NT GAINS ON UNIX, NETWARE

Percent of business applications supported by each operating system today and two years from now (base of 201 respondents)

applications	today	2 years	% of change
UNIX (161 responses)	30.0%	31.0%	+3.6%
NT SERVER (180 responses)	31.6%	44.1%	+39.3%
NETWARE (141 responses)	27.7%	17.6%	-36.6%
Other	10.9%	7.4%	-32.4%

SOURCE: COMPUTERWORLD INFORMATION MANAGEMENT GROUP TELEPHONE SURVEY

WIRED MEDICINE

Windows NT streaming media helps with healthcare training

Streaming media—rich, synchronized audio, video, and Web pages—plays an increasingly important role in organizations. Many companies are turning to streaming media over the network to reduce training costs by eliminating the need for workers to travel to training sessions. At the same time, it can provide a better training experience to more people.

Windows Media Services in Windows NT Server, for example, allows Partners Healthcare System, Boston, to literally put its medical expertise on the Web. The health organization, closely affiliated with the world-renowned Massachusetts General Hospital, is committed to educating physicians and healthcare professionals. Having already standardized on Windows NT Server, the organization had no trouble adding audio/video to its educational offerings, reports Joseph Kvedar, director of telemedicine.

"In the past, we brought people into an auditorium. Now they can access the same thing through a Web site using their browser and the Windows Media Player," Kvedar explains. Though it's not quite the same, he adds; it's better. Through the Web site viewers can simultaneously access supplemental information, such as PowerPoint® slides. The result is a richer experience for users. At the same time, Partners is able to reach a broader audience while saving time and money.

▶▶▶ Windows Media Services allowed Partners Healthcare System to easily add audio/video to its educational offerings, says Joseph Kvedar, director of telemedicine

Microsoft has shaped Windows NT Server into a leading multi-purpose operating system. IDC concludes: Windows NT will lead the OS market. This growth, IDC notes, will come at the expense of Unix and other operating systems.

PROOF IN PERFORMANCE

Market acceptance can be attributed, in part, to performance. In testing by Mindcraft Inc., Los Gatos, Calif., an independent test lab, Windows NT Server as a file server performed 25.5% faster than NetWare 5 when configured with out-of-the-box settings that customers can actually apply in real world environments. When performance is correlated to cost, Mindcraft found that Windows NT Server 4.0 provides 2.7 times better performance for the price (www.mindcraft.com/whitepapers/nts4nw5filesvr.html). In Web performance tests Mindcraft found Windows NT Server 4.0 to be four times faster than Solaris 2.6 with its Web server and it offers 10.3 times better price/performance (www.mindcraft.com/whitepapers/nts4sol26web.html).

Windows NT Server also enjoys widespread industry support from thousands of hardware vendors, independent software vendors, and support services companies. "There are over 200,000 professionals trained on Windows NT, more than with any other platform," says Microsoft's Nash.

Windows NT Server 4.0 clearly delivers. "The application we built for Snapper could not be built on NetWare," Connelly insists. The application for Windows NT was quicker to build and used less hardware than would be the case with other operating systems, and it is also more scalable and easier to administer, he adds.

→ Continued on page 12



KURT STIER

SERVING UP APPLICATIONS

Windows NT Server takes business to the Web

At the heart of every business are applications that allow the organization to take orders, buy inventory, deliver goods and services, and perform a host of other activities.

An application server is a group of software services that support the creation of robust, scalable server applications, which are accessible from browser and non-browser clients.

Windows NT Server is widely accepted as a leading application server. Thousands of independent software vendors target their applications for the Windows NT platform. These vendors are taking advantage of the rich application services provided by features such as Microsoft Transaction Server (MTS) and Microsoft Message Queuing Services (MSMQ) in building n-tier distributed applications.

For example, MTS provides the services a Windows NT application needs to be distributed, secure, and transactional. With an easy-to-use programming model, MTS makes these application services available to mainstream developers, allowing them to spend more time on business problems.

As an application server, Windows NT Server enables the rapid development of applications. It provides a robust, secure transaction environment able to handle business-critical applications and offers messaging and queuing for interoperability. In the process, it delivers efficient database pooling and load balancing, ensuring that the organization gets maximum performance from its systems. All of this technology is unified by a single component model, making it easier to integrate and evolve applications. By capitalizing on the power of component-based application services, organizations can take their existing products and re-deploy them on the Web as Windows DNA (the Microsoft n-tier architecture) solutions easily by leveraging the application services in Windows NT Server.

BUILT FOR THE WEB With Web connectivity built directly in Windows NT Server, organizations can position themselves to tap into a rich and growing e-commerce environment. The integrated application services provided by Internet Information Server (IIS) in Windows NT lets organizations use

the Internet to share information or provide rich Web-based application services.

For example, 1-800-Flowers Inc., Westbury, N.Y., a direct marketer of flowers and e-commerce pioneer, initially built its Web commerce system in-house. "When application services like MTS and IIS became available, we liked what they had to offer. We have been able to build an enterprise class Web



site by leveraging the strengths of the Windows NT Server," recalls Donna Iucolano, vice president, interactive services.

The 1-800-Flowers Web site is built on top of the application services found in Windows NT Server and integrates with the back-end order processing and fulfillment systems, which are built on an Oracle database and run on the Unix platform. The company runs a mix of Windows NT and Unix servers. Says Iucolano, "Windows NT is a powerful platform for developing distributed applications. Our programmers can focus on the business tasks at hand because they have a seamless development environment based on the integration of Windows NT Server, the application services, and the development tools." Windows NT Server also provides a very scalable environment. "Our business is seasonal and Windows NT is also easy to scale up for peak times," Iucolano explains.

Similarly, barnesandnoble.com, the Web commerce arm of Barnes and Noble, adopted Windows NT Server for its platform and systems infrastructure when it launched its online business in 1997. The giant bookseller chose Windows NT Server 4.0 for its scalability and flexibility, notes Ben Boyd, vice president, communications.

Windows NT Server has proven itself. Barnesandnoble.com experiences 19 million page views on average each week. It has been cited as the third-largest e-commerce site. "Windows NT Server and its application services are the infrastructure that will take us into the future," Boyd concludes.

Although not every business is as engaged in Web commerce as 1-800-Flowers and barnesandnoble.com, the same application services that make Windows NT Server ideal for Web business also make it effective for intranet and extranet applications.



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STICKING TO THE BASICS

Windows NT Server stays true to its core

While it is the advanced features of Windows NT Server that grab attention, the multi-purpose operating system continues to deliver efficient core networking services such as very fast and reliable file and print. The Windows NT Server file system (NTFS) is a highly scalable, easy to manage, secure file system for sharing files across an organization, regardless of the desktop system. Windows NT Server supports MS-DOS® and all 16-bit and 32-bit Windows-based clients, as well as Unix and Macintosh clients. It also works with other servers that may be on the network, such as NetWare and Unix.

Strong security is another core capability. "Windows NT Server offers the most robust and flexible security model of any general-purpose server or workstation operating system on the market today," asserts Microsoft's Nash. It includes such features as trusted-path logon and the Security Reference Monitor, which establishes a single place within the operating system for resource authorization services. This ensures that customers can lock-down their environment as they see fit.

Windows NT security, however, is flexible. Windows NT Server can be configured to favor user convenience over security, or to provide the high security that is often required by government agencies.

Windows NT Server also provides a core set of built-in services that form the foundation of basic management. Administrators can balance both centralized and decentralized control, ensure service availability and quality of service, and minimize cost of ownership. Windows 2000 Server will enhance

▶▶▶ **Adaptec's Ryan Fernandes, network operation manager, says switching from NetWare to Windows NT Server resulted in cost savings.**

ANNE HAMERSKY

Windows NT Server's management capabilities with the Active Directory, allowing administrators to manage system resources more easily and efficiently. Those are precisely the features that have Adaptec pumped up about Windows 2000 Server. Until last year, Adaptec relied on Novell NetWare as its primary file and print server, as well as for database and application serving. Adaptec switched to Windows NT Server, however, and the result was a savings in costs, reports Adaptec's Fernandes. The company anticipates even greater savings to come with Windows 2000 Server, he notes.

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IDC states: "Windows NT is already a requirement for success among virtually all industry vendors." IDC projects Windows NT Server to surpass NetWare as the top installed server OS by 2000-

2001. Looking ahead to clustered Intel servers, a new hierar-

chical Windows 2000 Active Directory, and other advanced features in the Windows 2000 operating system, it will only get better.

The same will likely be said for midsize organizations. Windows NT Server gives midsize organizations what they need to compete in the information-driven environment of the 21st century: a flexible, efficient, and open computing infrastructure based on Windows. ♦

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premium for each eligible subscriber enrolled hereunder who elects HMO membership for himself/herself and his or her family dependents."

Translation: "Your monthly premium payment must be paid by the last business day of the month preceding the month of coverage. You agree to pay, on or before the premium due date, the total monthly premium for every member enrolled and his or her dependents."

That does sound better. But does using plain language do anything for the bottom line? Etzkorn cites the example of a major bank (whose name she would not disclose) for which Siegel & Gale consolidated separate savings, checking and cash management forms into one and replaced direct mail inserts with customized information. The result: The bank saved \$1.2 million per year in postage, \$88,000 per year in envelopes and \$108,000 per year by replacing some direct mail inserts with customized marketing messages, Etzkorn says.

Not to mention the priceless goodwill the bank must surely have earned among its customers who, at last, could read their statements. ■

The Net Never Forgets

GLOBAL INTERMEMORY Future archeologists may decode the zeros and ones embedded in the digital layers of the Internet to get a picture of the Information Age much as 19th century British Assyriologist Sir Henry Creswicke Rawlinson deciphered cuneiform to unravel the mysteries of the Bronze Age. Since July 1997, a team of five research scientists at the NEC Research Institute in Princeton, N.J., have been developing a new kind of global, distributed computer memory that might make the task of those archeologists a whole lot easier than Sir Rawlinson's.

The Intermemory, as it has been christened by the NEC scientists, will preserve information perfectly and protect it in perpetuity, invulnerable to hackers, power outages, natural disasters, war and just about everything with the possible exception of Armageddon. At least, that's the theory.

According to NEC Research Scientist Peter Yianilos, individuals and institutions can create their own Intermemories in which they can save valuable documents such as memoirs, photographs and letters, or, in the case of companies, corporate histories and financial information. Through a combination of erasure codes,

Y2K

COUNTDOWN

8 MONTHS & COUNTING

A Y2K Lawsuit Settled

NO ONE IS REALLY SURE what the effects of the millennium bug might be. On the other hand, everyone is pretty sure they're going to be sued. The feeling is that Y2K is a full-employment act—for programmers before the turn of the century and for lawyers afterward. Given that horrific scenario, it's downright comforting to hear of two companies that have settled their Y2K dispute out of court through mediation.

The case was straightforward. In 1989, J. Baker Inc., a Canton, Mass.-based apparel and footwear retailer, hired Andersen Consulting LLP for advice on the acquisition of a merchandising and inventory system. It went live in 1991, and J. Baker was so happy with it, the company served as a customer reference for Andersen. However, as the millennium approached, the retailer went back to Andersen to get the system upgraded to Y2K compliance. The problem was that Andersen, like several other consulting firms, wasn't doing what it called "Y2K fix-it" work. When J. Baker realized it was going to cost nearly \$3 million to upgrade the system, it tried to recoup those costs, insisting that Andersen's software should have been compliant. Andersen responded that it had fulfilled every aspect of the contract the two had signed in 1989.

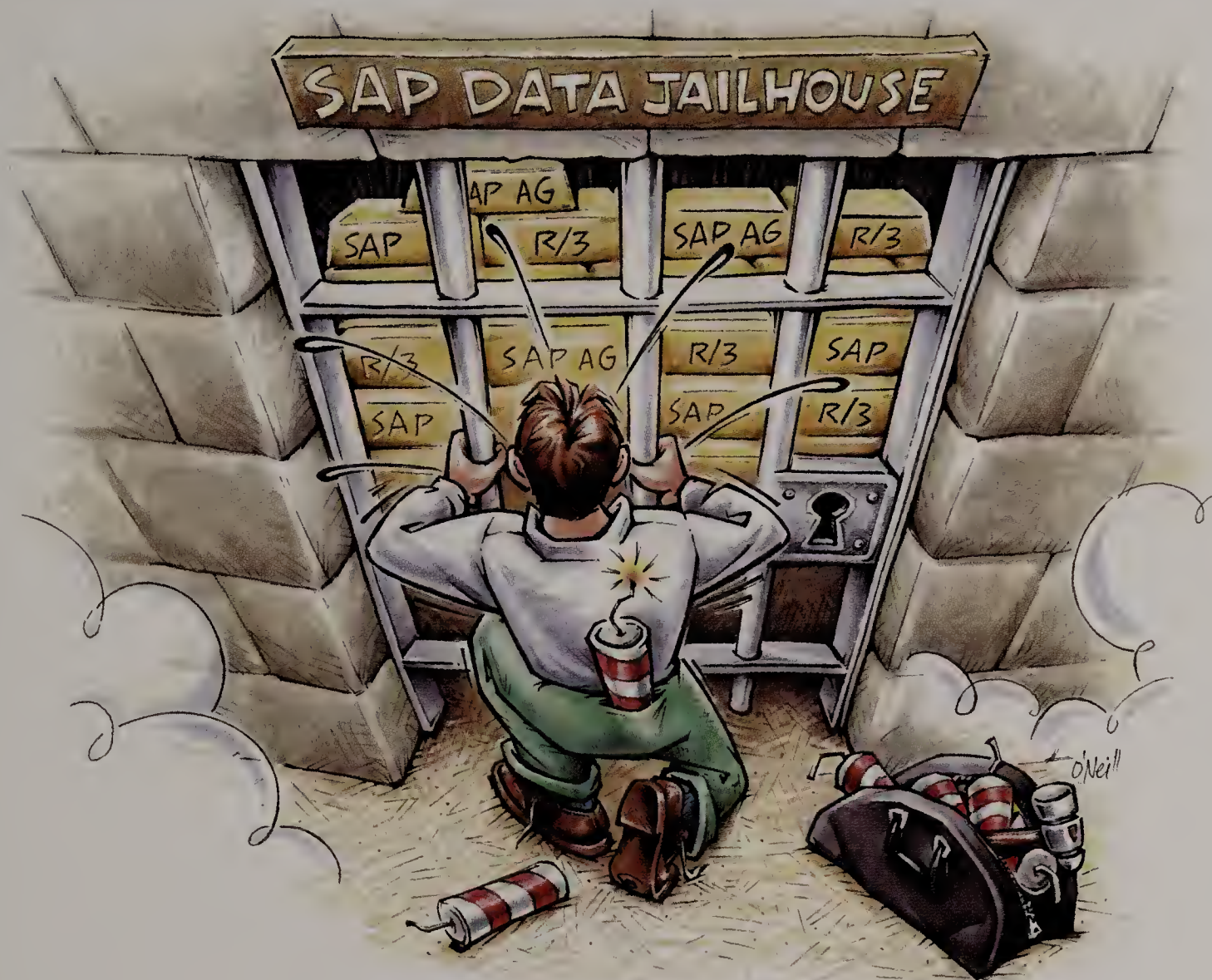
Eventually, the two companies agreed to put their arguments before Eric D. Green, a law professor at Boston University who runs a mediation service in Boston called Resolutions LLC. Green's determination on the case will resonate for CIOs and their legal counsel: This wasn't a case about technology; it was a case about contract law. And there was simply no "black-letter language" in the contract, as J. Baker's First Senior Vice President and General Counsel Mark T. Beaudouin puts it, that required Andersen to make the inventory system Y2K compliant. J. Baker dropped its claim.

"The issue here was and remains whether contracts matter," says Andersen spokesman Eric S. Jackson. "A lot of people are saying Y2K is different, but it does not change fundamental legal principles [about contracts]."

Both parties recommend the mediation route. "Mediation is very valuable whether it be Y2K or any intellectual property dispute," Beaudouin told *CIO*. "In formal litigation proceedings, in front of a jury, you never know what they're thinking until you get the verdict." The beauty of mediation is that someone knowledgeable hears both sides and tells you straight-out which arguments are strong and which are weak. "Mediation," says Beaudouin, "is a way to avoid the tremendous expense of litigation, not to mention the distraction of management and the other resources that have to be thrown at it."

—Howard Baldwin

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Yianilos and his colleagues are testing a small prototype of an Intermemory in the lab and they hope to have it fully implemented for the millennium.

For more information, visit www.neci.nj.nec.com/homepages/pny/intermemory. ■

All Worked Up

THE CULT OF BUSYNESS Move over, caffeine and nicotine; there's a new addiction in town. Canadian career self-management expert Barbara Moses suggests that the latest bad habit to hit turn-of-the-century society is busyness. Moses, president of Toronto-based BBM Human Resource Consultants Inc. and author of *Career Intelligence: The 12 New Rules for Work and Life Success* (Berrett-Koehler, 1998) and *Career Planning Workbook* (BBM, 1995), contends that most of today's workforce is trapped in a "cult of busyness" that is forcing us to forfeit other parts of our lives in favor of work. CIO recently spoke with Moses about her theory.

Q: What do you mean by the "cult of busyness"?

A: We're all leading these overcommitted, hyperbolic lives and juggling incredible demands on all fronts. We wear our busyness like a badge of honor. Never before have there been so many demands on us, yet never before have we had less time to rise to these new challenges. Call anyone and they'll say, "It's so crazy" or "I'm so busy, you wouldn't believe it." But we're paying a huge price for this busyness.

Q: What are we losing?

A: We're losing the ability to be introspective. We're defining ourselves by our busyness. We've so generated the concept of busyness that one general manager recently told me, "When I'm thinking, I sit with my fingers poised on the keyboard so nobody knows I'm just thinking." We've become intoxicated with being busy.

Q: How did we get to this point?

A: The pressures to be productive have gone through the stratosphere, so the bar keeps going higher and higher. People say, "If you can work 80 hours a week, why can't you work 85?"

Q: What role does technology have in perpetuating the cult of busyness?

A: It's a huge enabler. It's just one more way people can get through to you. It's too easy to fire off an e-mail or a voice mail without thinking, just to get something out of your in-tray and into someone else's. And high-tech people are particularly willing to do that, to pull all-nighters.

Q: Are younger generations looking at this differently from older generations?

A: There's no question that twentysomethings are questioning the effort-reward equation. A lot of children of career-obsessed parents are cynical. They're saying, "I don't want to be like that." And they're starting to push back, much to the consternation of fortysomething CEOs.

Q: What can we do to resist the cult of busyness?

A: We can protest. We can refuse to become an active player in this cult. We can ask ourselves, "To what end am I working? What am I accomplishing?" We can use more thought before we act and ask ourselves if our acting is leading to achieving. And we can ask ourselves what we're sacrificing. When you're 70, are you going to remember that meeting at Starbucks with your boss at 7 on a Saturday morning?

—Meg Mitchell



Barbara Moses is busy telling us how busy we are.

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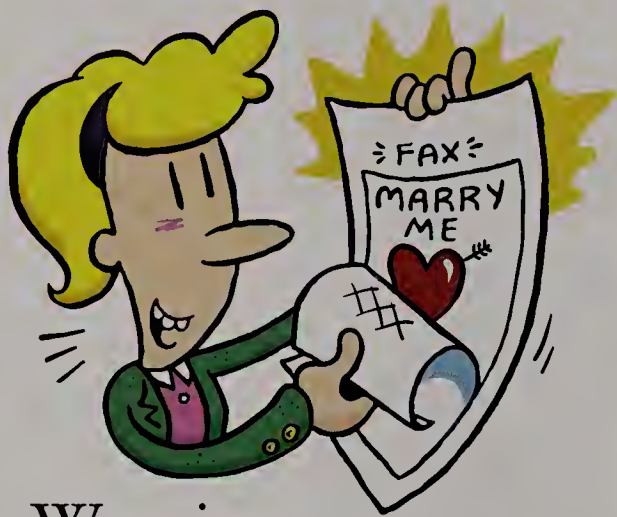
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The sealed fax machine, called ASC-9710, plus two rolls of recording paper costs \$1,450. For more information, visit www.kurashiki.com/sansui. ■

Findings IT Spending

A Time for Change

A funny thing happened to IT organizations on their way to 1999. At the precise moment many hit their stride in delivering business value to their respective enterprises (see the special issue on the Enterprise Value Awards, CIO Section 1, Feb. 1, 1999), the global economy fluctuated wildly, the United States sank deeper into its protracted labor shortage and Y2K scrambling intensified. Indeed, 1998 data collected by Stamford, Conn.-based Meta Group Inc. from 426 enterprises around the world seems to suggest that the year was marked by major change and basic discontinuity in the workings of IT organizations.

Meta's "Industry Watch 1998," study, part of the "1999 Worldwide Benchmark Report" studied 1998 IT priorities, spending patterns, staffing issues and metrics in a database of 16,000 contacts from 6,000 companies in 50 countries. Among the findings elucidated in an Industry Watch summary by Howard A. Rubin, Meta Group research fellow and CEO of Rubin Systems Inc.:

- IT organizations are evolving to become systems integrators, package implementers and sourcing managers. The movement of resources to packaged solutions is squashing the traditional work focus on development and maintenance work. (For more on this trend, see "Staying Alive," CIO Section 2, Feb. 15, 1999.) Activity in these traditional IT areas is down by 33 percent since 1997, while package-related activity has tripled. Similarly, outsourcing of all types is up an average of 42 percent since 1997.
- Net activities now overpower the traditional IT spending model, with almost 28 percent of spending focused on the Internet, intranets, the network and new hardware. This virtually equals the percentage spent on traditional software development and maintenance spending in 1998 (31.4 percent) and dwarfs data center expenditures of 8.5 percent.

■ The budget brakes appear to be on. While the same study showed a major jump in IT spending two years ago—from 5.1 percent of gross revenues in 1996 to 6.9 percent in 1997—in 1998 the increase was only 0.2 percent of gross. This is a tenfold decrease in the rate of spending increase.

■ More leverage is being demanded from IT human resources. In 1995, the average IT worker supported 38 non-IT staff; in 1998 the ratio was 52 to 1, a 37 percent increase.

■ Despite the attention paid to process maturity and capability, only one in four IT organizations uses a standard development life cycle method. Meanwhile, only one in eight has a software-metrics program, one in seven has a software-process group, one in seven has an IT/business process-reengineering group and one in five has a quality-assurance function.

The study also noted that, worldwide, the top five IT priorities are, in order, resolving Y2K issues, increasing business alignment, improving the quality of systems and services, decreasing costs and updating technology infrastructure.

For more on the study, visit www.metagroup.com.

—David Pearson

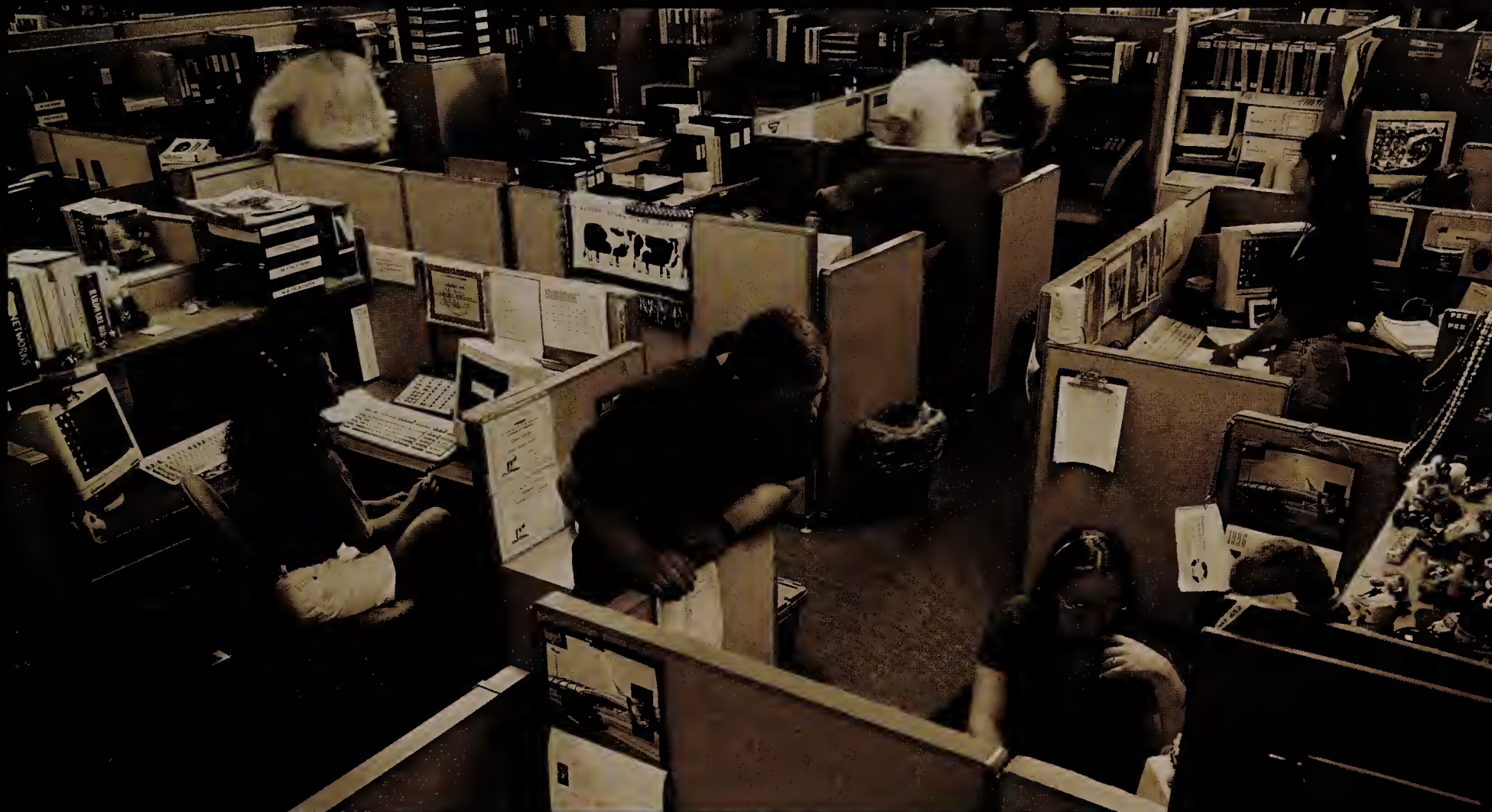
Where the Work Is

IT groups in 426 enterprises worldwide are spending less time than they used to on traditional development and more on package-related functions

Percent of IT Department Time

	1996	1997	1998
New Development	36.7	25.6	24.9
Package Installation	7.8	17.2	18.4
Maintenance/Support	39.9	34.7	34.5
Package Modification	7.1	9.4	9.5
Migration	8.5	131	2.6

SOURCE: META GROUP INC.



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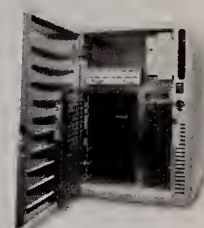
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From Data to Knowledge

We continue to gather more and more information, but what are we doing with it?

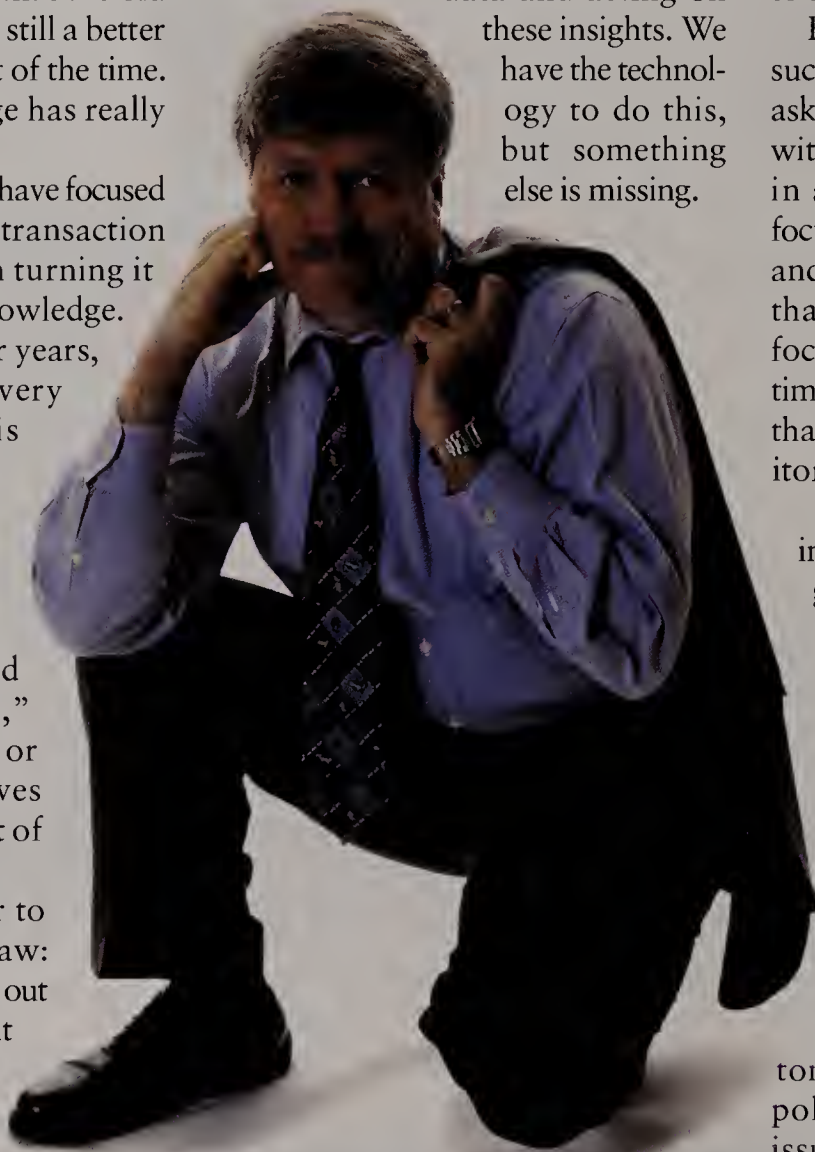
WHEN YOU THINK ABOUT it, many concepts in our world are misnamed. Chief information officers are really chief technology officers; business analysts are usually just systems analysts. Our entire field is a misnomer. It's called information systems or management information systems, but I would argue that the old term "data processing" is still a better fit for how we work most of the time. And the Information Age has really been the Data Age.

It's unfortunate, but we have focused too much on mastering transaction data and not enough on turning it into information and knowledge. We've talked about it for years, but it doesn't happen very often. The situation is reminiscent of 16th-century England, when Sir Thomas Gresham, an English financier, popularized Gresham's law. It's usually stated as, "Bad money drives out good," meaning that worthless or debased currency drives more valuable money out of circulation.

Today we might refer to Gresham's information law: Bad transaction data drives out good knowledge. Not that transaction data itself is bad—it's a necessary precondition for turn-

ing data into knowledge—but the continued focus on data at the exclusion of higher-value forms of information is not doing us much good. In the rush to ensure that employees and suppliers are paid, orders are taken accurately, and debits and credits are posted to the right ledgers, we have neglected the realm of analyzing and interpreting trends in the data and acting on these insights. We

have the technology to do this, but something else is missing.



Some Data About Knowledge

What's the evidence for this outlandish hypothesis? I'll give you several small bits of data and two large ones. The first big bit relates to ERP. I have just finished a research project funded by SAP AG in which I was trying to find evidence that the great new data supplied by that package—integrated, cross-functional, real-time and global—is being used to change management and decision-making processes. In other words, I wanted to see if the data was being turned into information and knowledge. And it was at a few places such as Amerada Hess, Dow Chemical and Microsoft. These companies are making great progress in educating workers and managers about what data is available, how to build data warehouses or marts and how to create organizational structures to do analysis and act on the results.

But there weren't enough of these success stories. In many cases, when I asked managers what they were doing with SAP data, they said, "Talk to me in a couple of years," or "We're focusing on getting the basic processes and transactions right." I'm worried that by the time they get around to focusing on using the data it will be time to install R/4 or R/5. Or to put in that new R/3 module to manage janitorial services.

The second big bit of evidence involves customer data. Companies gather a lot of it in transaction systems, but they don't do much with it. I've written about this in *CIO* before, so I will pretend that you remember that article and have already solved the problem. But many companies (probably all nonsubscribers of this publication) still find great difficulty in the number of systems across which customer data is spread, the poor quality of customer data and the organizational politics involved in addressing the issue. The other problem with cus-

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customer data is that organizations gather too much of it.

A team that's developing a customer data warehouse asks everyone what customer data they want and throws it all into a big warehouse. It's then often too big for people to find and understand the right data. The customer data equivalent of the SAP story described above occurs

and HR data processing ever since. Yet as a recent McKinsey & Co. study points out, most companies do a very poor job of managing their talent. They don't know what skills they need or what their people have. This situation doesn't have to prevail. A manager at Ford said the company had bought the PeopleSoft package not to handle basic

in a new research project. But I do already know that whenever I have come upon an example of the successful use of data for decision making and management, the following types of people seemed to be hanging around:

- Some "rocket scientists," for example, PhDs in statistics, who cannot only tell the algorithms where to look in the data but also explain the results to managers.

- Senior executives who realize the value of data analysis and who sponsor efforts to create data warehouses or marts and get business value from them.

- Analysts and middle managers who know what data is available and how to access it.

- IT people who see the big picture and try to create the circumstances in user organizations in which data is used to solve business problems.

At Dow Chemical, for example, the head of the strategic planning department sponsored an effort to figure out how to use SAP data in new reporting processes. The IT organization worked with its users to create a number of function- and process-specific data marts. Perhaps most important, over 5,000 people—from the factory floor to the CEO's office—were trained on data structure, access techniques and analysis tools.

For IT people, the challenges of turning data into knowledge are just another example of the need to expand our vision. We should focus our sights not on providing good technology or even good data but on helping the organization make good use of information in business and management processes—whatever it takes to do that. The best name for our function isn't data processing or information services or IT but rather something like, "the competitive advantage from information" function or the "better decisions and actions" department. In order to live up to those kinds of names, a lot of raw data is going to have to be cooked up into knowledge. **CIO**

Thomas H. Davenport is a professor of management information systems at Boston University School of Management and director of the Andersen Consulting Institute for Strategic Change. He can be reached at thomas.h.davenport@ac.com.

You need fast hardware and capable software, but what most companies overlook is the "wetware."

when companies install customer asset management systems to support sales and service transactions. These systems could also be used to support knowledge management initiatives such as customer problem resolution, forwarding customer and product knowledge to other parts of the organization for trend analysis. Instead, they're used for tracking trouble tickets.

Now for some piddling little examples of the data-to-knowledge deficit. Take scanner data in retail stores. The CIO of a grocery chain that is highly regarded for its IT use once confided to me that his company analyzed at most only 2 percent of the data it collected. I heard recently that a Midwestern grocery chain had decided to throw away its scanner data. Previously, the data had been saved for years in the hope that someday it would be analyzed, but it never was.

Web transaction data is increasingly following the same pattern. I spoke with the designer of a large information technology firm's Web page. He described a series of changes to the page over time that involved such fashionable features as streaming audio and video, frames and lots of white space. I asked him whether anyone had ever analyzed the site transaction data to see what visitors actually did there. He said, "Oh, sure, we found out that what most people did on the top-level page was to initiate a search, so we made the search button larger." And that was the extent of Web transaction knowledge.

Then there's basic financial and HR data. The first IT application in business in 1953 at General Electric involved payroll. We've had variations on financial

HR transactions but to capture and manage HR knowledge for purposes of talent management, succession planning and general HR analysis and decision making. Why don't more companies do that?

It's Not the Technology That's Missing

We have the technical capability to transform data into knowledge. In fact, in the 20 years or so that I've been paying attention to the IT management field, we've had several generations of analytical technology. Sometimes I suspect that only the names have changed over time. Let's see—there was decision support systems, then executive information systems, then OLAP/ROLAP/MOLAP, then data warehousing and mining. Have I missed anything?

Peter Keen, one of the founders of the decision support movement, noted recently that decision support felt an awful lot like data warehousing to him. I heard someone say recently that they were doing some data mining in her company, and I asked what technology they were using. "It's called SPSS," she said. That meant I had started my data mining career in 1975! So we've not been lacking in technology; but something else has been missing.

What is it? As with so many other things in the realm of IT, the missing ingredient is people. You need fast hardware and capable software, but what most companies overlook is the "wetware." What, you might ask, is the wetware architecture for successful data-to-knowledge transformation? What kinds of people, skills and organizational structures are necessary to pull it off? To be honest, I don't really know for sure yet, since I am studying that very topic



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Connecticut CIO Rock Regan is not afraid to battle the labor union if it means saving the state's IT organization.

Connecticut Antes Up

Will Connecticut be the first state to outsource all its core IT systems? While the governor and the CIO think it's a sure thing, a lot of people call it a long shot.

BY TOM FIELD



ock Regan is no gambler, but he isn't afraid to bet. The first-ever CIO of Connecticut, Regan occasionally cranks the slots at nearby Foxwoods Casino. And not long ago, on a trip to Kentucky, he played the ponies and won big. With his winnings, Regan bought two huge portraits of thoroughbred racing legends John Henry and Secretariat. These framed prints now hang on opposite sides of Regan's sparsely decorated Hartford office, overlooking—perhaps inspiring—the man who just placed his biggest bet yet.

Regan intends to do what no CIO has done before: outsource a state government's entire IT operation. Over the objections of a rebellious labor union and skeptical legislators, he is negotiating a seven-year, \$1 billion contract that, if it clears final legislative hurdles, will see Electronic Data Systems Corp. (EDS), the Plano, Texas-based outsourcing giant, manage the state's entire \$300 million IT investment—data centers, networks, desktops, staff, the works.

Although far from done, Connecticut's deal is already unprecedented. Other states have talked about full-scale outsourcing before, but none has done it (see "Losing Bets," Page 38). Other CIOs have preached the potential cost savings and efficiencies of privatizing public sector IT, but

Reader ROI

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none has secured the executive and legislative sponsorship necessary to succeed.

Regan thinks he can beat the odds. And if he's right, then the Constitution State stands to take a giant step forward in the use of leading-edge technologies to deliver business permits, auto registrations and other key state services better, faster and cheaper than Regan's own IT organization can do now. Regan and Gov. John G. Rowland, who has staked his own political future on this bet, will be hailed as pioneers of public-private partnerships. EDS, a

company reputed to be as stodgy and intractable as its founder, H. Ross Perot, will be seen as a nimble entrepreneur in what could be a booming new outsourcing marketplace.

But if he's wrong—if organized labor and party politics undo this deal—then there will be no leaps forward. Connecticut's page in outsourcing history will be buried within the long, gray chapter about failed government initiatives. Regan will be a footnote.

It's a bet he's willing to take.

Systems Developer Oscar Gomez fears outsourcing will mean longer hours and less control.



THE problem

At 38, Gregg "Rock" Regan is younger than and boasts less IT experience than many CIOs, but he has two advantages: 12 years of engineering and management work at Stratford, Conn.-based Sikorsky Aircraft Corp. and a lifelong relationship with Rowland. The two men grew up together in Waterbury, Conn., an old mill town about 40 minutes southwest of Hartford. Regan, three years the governor's junior, was best friends with Rowland's younger brother. In fact, the two boys used to swipe the future chief executive's prized BB gun. But boyhood feuds were forgiven by 1994, when Rowland was first elected governor and made IT reform a priority. Seeking trusted advice, Rowland turned to the big bear of a man he affectionately calls "the Rockster."

The problem, Rowland told Regan, was that Connecticut had developed a reputation of being difficult to do business with. There were too many agencies to deal with, too much red tape wound around permits and processes. There was no simple way to interact with the state. Rowland blamed IT inefficiencies, and he consulted Regan, then a project manager in the Office of Policy and Management, to explore this theory.

Regan discovered that although Connecticut spent \$300 million per year to manage IT, "central IT operations" was an oxymoron. "Every agency [all 65 of them] was going off and doing its own thing," Regan says, pointing specifically to the Department of Social Services and the Department of Children and Families, which serve many of the same clients but share none of the relevant data, such as which children and families are receiving what type of assistance. By Regan's count, 1,000 separate licenses and permits are being issued by 25 different state agencies, each of which has its own computer system. "We were unable to keep up with advances in technology and put it to use to improve government," Rowland agrees.

With Rowland's blessing, Regan hired IT consultant KPMG Peat Marwick LLP to study the state's IT resources. The report validated Regan's findings of "stovepipe" systems that distanced state agencies as well as missions, systems and processes that trampled all over one

another in redundancy. No one even knew how many PCs the state owned, never mind which models. And there were at least a dozen e-mail applications among the various agencies.

To be fair, Connecticut wasn't worse off than most states—and even some businesses. Yet, understanding that Rowland wanted greater bang for Connecticut's IT bucks, KPMG prescribed a dramatic makeover, recommending that the state centralize IT management within a new Department of IT headed by a new, cabinet-level CIO; invest in strategic planning, mapping out the missions of the various agencies and ensuring that IT plays a significant role in each of them; and explore IT outsourcing as a viable option for improving and managing the state's IT resources.

That last point got Regan's attention. He knew that many businesses—including Connecticut's own Aetna Inc. and Southern New England Telephone Co.—had successfully outsourced all or some IT operations, and he quizzed their CIOs about their experiences. Buoyed by positive feedback, Regan investigated the potential benefits of outsourcing and saw huge cost savings—maybe as much as \$50 million per year—plus new opportunities to be gained by partnering the state with a leading-edge IT services provider.

Of course, there was the people issue. Roughly 700 state employees would be affected by outsourcing. But the pluses outweighed the minuses, and Regan returned to Rowland with a concise conclusion. "IT is not the state's business, and outsourcing is something we shouldn't be afraid to do," he says.

THE process

Regan warned that this IT makeover might ignite a political firestorm, but Rowland didn't care. "I'm not concerned with the political heat we'll take," he said. "Technology has the potential to change the way we deliver services."

In fall 1996, Regan headed a small, executive-level team, including representatives from administrative services and policy management, charged with writing the legislation to create the new Department of Information Technology (DOIT) and CIO position (which Rowland then offered to Regan) and

preparing a request for proposal (RFP) to outsource the state's IT operations.

Immediately, these two initiatives were inextricably linked in the minds of critics—mainly General Assembly Democrats and state labor leaders. These opponents charged that Rowland was trying to create cushy jobs for his Waterbury buddies, that he was out to "get" state employees by privatizing their positions and that his hidden agenda was

"IT is not the state's business, and outsourcing is something we shouldn't be afraid to do."

—ROCK REGAN, CIO, CONNECTICUT

to toss big bucks at big-name technology vendors that might in turn support his larger political ambitions.

The firefight ensued.

Rowland and Regan had to make a strong case to the General Assembly, which was partisan and skeptical. Finally, in a July 1997 special session, the assembly funded the DOIT and CIO in its 1998 budget. But legislators attached conditions, namely that any future outsourcing vendor must employ all current state employees for at least two years and that the final outsourcing contract would have to pass inspection by the state auditor and General Assembly.

That last concession didn't satisfy the Connecticut State Employees Association (CSEA), which represents most of the data processing professionals who would be affected by outsourcing. The union has opposed outsourcing—and has been critical of Regan's activities—since day one, refuting the notion that any vendor can deliver IT services better or cheaper than state employees. At times the fight got personal. "Rock is a nice enough guy; he just knows squat about what he's doing," says Rick Melita, the CSEA's political education coordinator. "As usual, the governor ignores anyone who knows anything about IT and brings in his boyhood chums and political hacks."

Despite the opposition, Rock Regan was sworn in as CIO in July 1997, and he immediately faced a host of daunting challenges running the gamut from securing adequate staff and facilities to shoring up the state's Y2K defenses.

But every challenge came back to outsourcing. Regan could not undertake the necessary IT consolidation and standardization nor begin to think about staff and facilities issues until he knew who would handle these projects.

With help from outsourcing attorney Mark L. Gordon, managing partner of Chicago's Gordon & Glickson PC, Regan already had issued an outsourcing RFP. Initially, 37 vendors responded,

representing the full range of outsourcing providers—as well as the CSEA, which fought to protect its turf.

Regan asked for detailed proposals from roughly a half-dozen of the largest full-service vendors. He got four: one each from outsourcing "heavies" EDS, IBM Corp. and Computer Sciences Corp. (CSC)—and one from the CSEA.

Thus began a year-long period of endless rounds of meetings, interviews and reference checking. The buzz in Hartford was that IBM was a lock to win the deal because it had long, strong ties to state government. The CSEA, to bolster its bid, partnered with CSC, promising continued state employment for IT workers if CSC won the contract. EDS, meanwhile, quietly secured prospective partnerships of its own with several smaller vendors including Xerox Corp., Unisys Corp. and A.T. Kearney Inc.

Finally, midweek between Christmas and New Year's Day, Regan announced a winner: EDS—by a neck. "Each of the vendors could have done the job," Regan says, "but EDS was just a notch above the others." Specifically, Regan was impressed with EDS's diverse partnerships as well with executives' willingness to build a new central IT facility in Hartford. Regan also liked the EDS transition plan for state employees. "How our employees would be transitioned to EDS, the benefits and opportunities they would have—there seemed to be a little less risk [for the employees] than in the other vendors' plans," Regan says.

The CSEA begged to differ.



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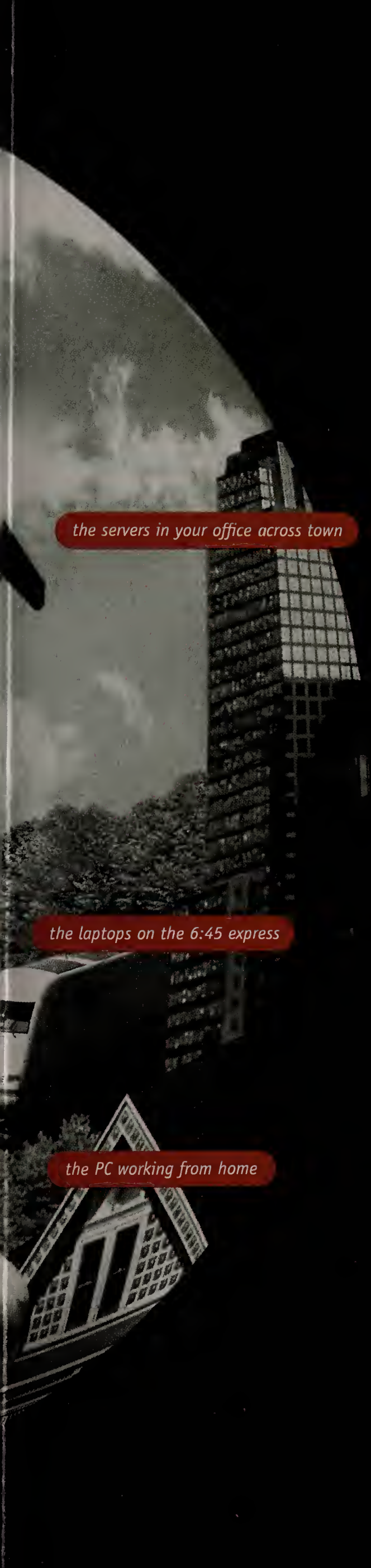
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Losing Bets

Other states have tried outsourcing—and failed

IN 1995 INDIANA ATTEMPTED TO become the first state to outsource all government IT functions. But reticent state officials and negative publicity combined to dash the plan.

Subsequently, Iowa floated a similar outsourcing bid that did not come to fruition, while Florida, New York and Texas succeeded in outsourcing only discrete IT functions.

So what makes anyone think Connecticut stands a chance? Two words: the governor.

"Like any other big IT project, you have to have an executive champion to make [outsourcing] happen," says John Thomas Flynn, ex-CIO of the state of California and current vice president of Litton PRC's State and Local Government business group. "In Connecticut, the governor [John Rowland] and [CIO] Rock Regan were the champions who together said, 'We're going to do this,' and so far they've made it happen."

The other factor in Connecticut's favor is that outsourcing is no longer a new idea. Enough businesses have demonstrated success at outsourcing—and enough other states have at least discussed the concept—that government officials now are less apt to dismiss the notion out of hand. Many of the early opponents of outsourcing have been swayed. "I have a saying," says Peter Bendor-Samuel, president of The Everest Group, an outsourcing consultancy in Dallas. "The early Christians get the best lions—and the best lions are quickly getting used up."

Depending on the roar of Connecticut's lions, the Constitution State may indeed write the book on successful state government outsourcing.

—T. Field

THE people

By Regan's estimation, the EDS announcement divided his IT staff into three distinct camps: those who welcome the prospect of working for a big-time IT vendor, those who are ambivalent and those who plain hate it. Count Oscar Gomez among the latter.

A systems developer at the Department of Social Services, Gomez has worked for the state for 13 years, prior to which he spent 10 as an insurance industry consultant. He has bad memories of the long hours and endless travel of his private sector work; that's what scares him most about the prospect of being outsourced. "I'm not interested in working 60 to 70 hours a week," Gomez says. "That's why I took a pay cut to come to work for the state. My priorities in life have changed. I don't want to work a ton of hours and earn the big bucks; I want to do my work and then go home to spend time with my family."

Gomez disputes Rowland and Regan's complaints of how the state's information systems can't communicate with one another. "That was by design; we were told to do that," Gomez says. "We put security systems in place so that one agency could not access another agency's information without authorization." If, in fact, the mandate now is to connect the systems, "We're as competent as anyone else to do this work," Gomez says.

Gomez and CSEA's Melita agree that the state's IT operations were in disarray before Rowland took office, and they credit Regan (however grudgingly) with providing some much-needed organization. But they don't like where the new CIO is headed. "He's taken a bus that couldn't run, and he's revved it up to 90 miles per hour," Melita says, "and now he's driving it head-on into a bridge abutment."

THE possibilities

Since January 1999, Regan has been in constant contract negotiations with EDS. If all goes as scheduled, by late August the pact should be before the General Assembly, where a 60 percent vote in either house can kill the deal. Depending on who wins, outsourcing

could die by the end of August or begin in September.

How intensely is this deal being watched? "You can't overestimate the significance of what's happening in Connecticut," says John Thomas Flynn, ex-CIO of the state of California and current vice president of Litton PRC's State and Local Government business group. State and local government CIOs nationwide are watching this deal, Flynn says, and if it passes it will likely be but the first of many similar outsourcing arrangements.

At press time, California's San Diego County—a municipality similar in size to Connecticut—was getting ready to issue an RFP for its own full-scale privatization initiative, and outsourcing experts believe as many as 20 other states and counties wait in the wings to see what happens in Connecticut. "By itself, this is just another monotonous billion-dollar outsourcing deal," one analyst close to the deal says. "But there are 50 states out there—potentially 50 billion-dollar deals. That's a market the commercial vendors would like to get into."

No one's anticipation matches Regan's. He sees EDS stepping in to standardize disparate IT systems, train knowledge-thirsty technologists and enable an information network so robust that residents and businesses alike will find instant, electronic access to a bounty of public services like automobile registrations and building permits. If his bet pays off, Regan knows he will have cast an indelible imprint on the way Connecticut serves its people.

But if he loses, then IT transformation goes back to square one. And if that happens, then Regan believes the state loses too. "We'll lose our ability to use IT to drive significant change to business processes," Regan says. "There's no way for us to do that internally."

And although Regan won't say it, another principal close to the deal will: "Opportunity is at stake here. If this deal falls through, then Connecticut won't just be treading water, it'll be falling behind."

It's still a bet Rock Regan is willing to take. **CIO**

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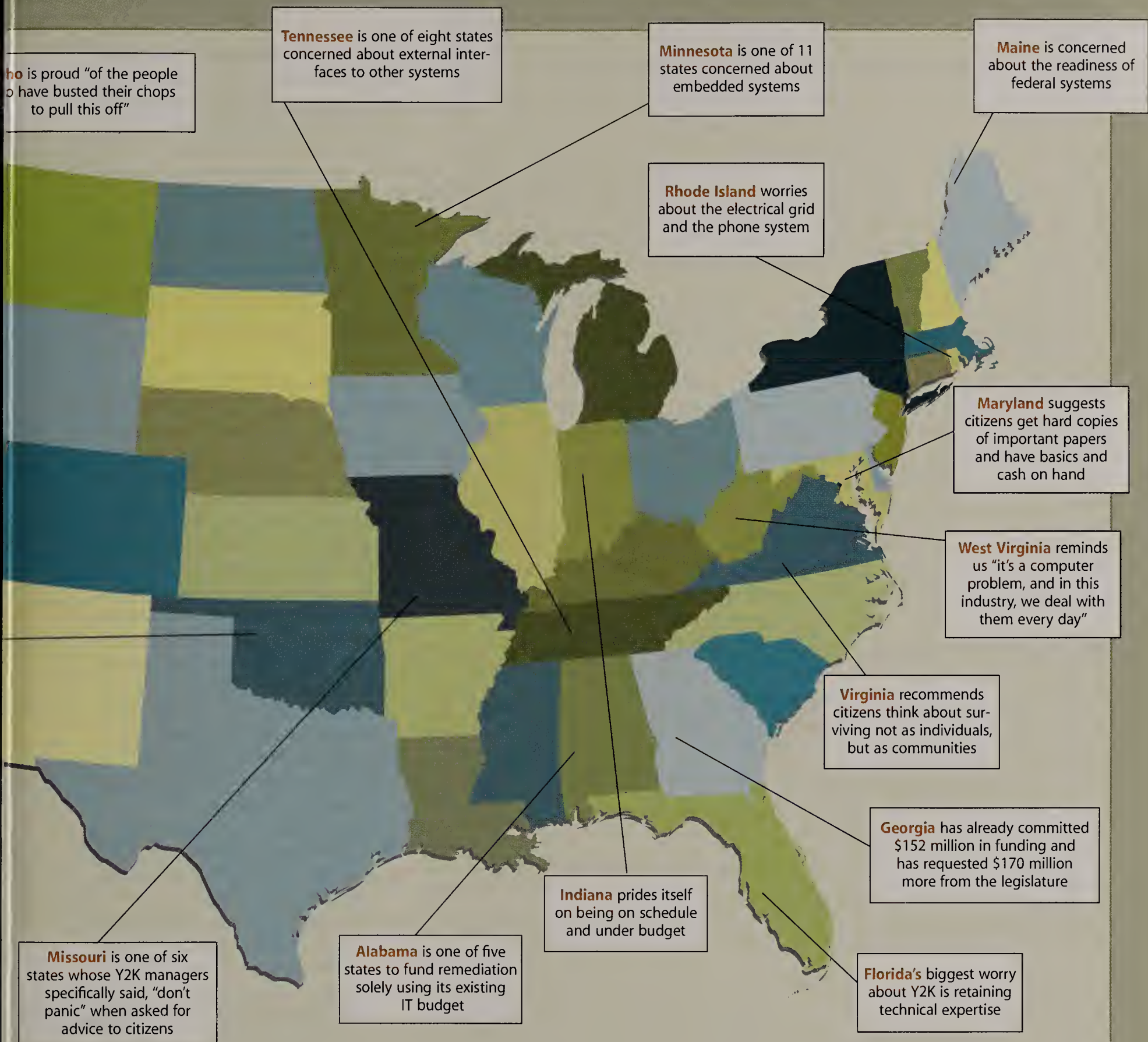


It's A NIGHTMARE SCENARIO: The millennium bug bites state and local government institutions so badly that they actually institute a draft, akin to a military draft, of programmers. IS employees are called upon to fight the enemy, leaving CIOs to keep the home fires burning, wondering when life will return to normal.

One Financial Corp. CIO James Donehey, who's working on a Y2K commission formed by Virginia Gov. James Gilmore. Donehey comes up with this stuff only when his imagination runs amok; in reality, he believes—as do many of his CIO counterparts in state government—that we'll be seeing glitches, but who knows where or when?

easier as your staff dispatches the snags that are popping up. But no corporation is an island. *CIO* wants you to know the progress of the states in which you do business so that you can apply it to your contingency planning—or offer to help. We embarked on an ambitious project to map the Y2K progress of all 50 states.

Although the NASIRE Web site (www.nasire.org) lists such information, we wanted more. Editorial staffers Kathleen Carr, Meridith Levinson,



Carol Zarrow and Lynne Zouranian split up the 50 states and contacted their Y2K project leaders. We also surveyed folks who deal with state government on a regular basis—consultants, vendors, other municipal CIOs—to get a broader view of what you can expect from your state government next year. The upshot is cautious optimism: Steve Kolodney, director of the Washington State Department of Information Services and chair of the NASIRE Y2K Committee,

predicts that *most* of the states will have *most* of their mission-critical applications remediated in time.

All Over the Map

The survey shows a wide spectrum of results. Alabama reports that it's only 21 percent done, even though it started its remediation in November 1996, but it's also been trying to do the job within each agency's current operating budget. Several states, including Nebraska, New York and Pennsyl-

vania, report their projects are virtually complete. Not to be Clintonian, but as we were going through the results, the question arose: What's *complete*? Does it mean assessment? Remediation? Testing? Auditing?

Further, even if the majority of the work is done, that still sends up red flags. "A project can be stuck at 70 percent [complete] for a long time before it's declared a failure," laments Bruce Lazenby, vice president of business development at FreeBalance Inc.,

an Ottawa-based vendor of software targeting the public sector.

Budgeting figures can be misleading too. You might think a state that has budgeted over \$100 million for remediation is well prepared, but John Kelly, who's spending \$125 million as CIO for the state of Arizona, warns, "Different states use different definitions of qualified expenses, which makes comparisons among states misleading. Those that have fewer qualified expenses will look like they are not spending sufficient funds. Those that have broad definitions will look like spendthrifts."

That explains how five states (Arizona, Illinois, New York, North Carolina and Oregon) have spent over \$100 million, while California and Texas have spent more than \$240 million. Georgia, however, is the topper—it has spent \$152 million and appropriated \$170 million more. Whether that's related to alleged perfidy among its ranks is anybody's guess (see "Gravy Train to Georgia," Page 43).

There was some consistency in the results, however. Like their private sector counterparts, state IT folks fear the things over which they have little or no con-

ately obvious. But when we asked the Y2K project leaders for their advice to citizens, the most common refrain was reassuringly simple: "Don't panic."

Charting Progress

The results of CIO's survey of the 50 states appear on Pages 44 to 47. For comments from the states' Y2K project managers and CIOs as well as Web site URLs and e-mail addresses for officials in the states where you do business, visit www.cio.com/forums/y2k/state.html.

trol—that is, interfaces to other systems and their supply chains. Kelly reports that Arizona gets approximately \$4 billion from the federal government for state transportation and social services programs (among others), and he's concerned about what will happen if the Treasury department has a Y2K problem. Embedded systems were an equally cited source of concern, simply because what they do and where they are isn't immedi-

There are some bright spots. In Pennsylvania, Gov. Tom Ridge chartered former CIO Larry Olson to put together an executive survival guide for both public and private sector executives (see "State of Preparedness," Trendlines, CIO Section 1, Feb. 1, 1999). Pennsylvania has mailed 52,000 within the state and has been sharing information with as many states as have requested it as well as with counterparts in Belgium, Canada and Singapore. The state also subjects cabinet officers to ongoing report cards on their agencies' progress. In Kansas, Chief Information Technology Officer Don Heiman built a mainframe testing center that agencies can use to check their applications' compliance.

At the other end of the spectrum, Oklahoma and Wisconsin declined to participate in our survey, despite repeated prodding. We suspect it was not the questions themselves, or even the few minutes it would have taken to fill out the survey—we wonder if these folks simply may not have known where they stood, a disturbing prospect in spring 1999.

A Different Kind of Battleground

Let's face it, though, despite their similarities, the problems facing IT folks in the states are different from those in the private sector. Although many states have CIOs, there are still others where the idea of a centralized IT administration hasn't gained a foothold. In most states and municipalities, individual agencies are fighting the Y2K battle on their own (see "Dark City," left).

The situation is exacerbated by other problems. Agencies frequently fight for their own share of limited

Dark City

Municipal mishaps may threaten even the best-laid Y2K plans

"I BOUGHT A WALL SAFE BECAUSE WHAT I HEAR FROM GOVERNMENT ORGANIZATIONS is starting to scare me," reports David Barber, president and CEO of Ocala, Fla.-based Imagination Technology Solutions Inc., a reseller of Y2K software.

Why is Barber nervous? Because the majority of his clients are municipal government agencies, and he's seeing less planning and remediation there than anywhere else. He blames the "culture of civil service. They're not communicating with each other. I think they're afraid to. Everyone's holding cards close to the chest, afraid of losing their jobs. But if you're the sheriff's office and you can't do payroll or keep track of your release records, how hard you tried isn't going to matter."

Inside the agencies, when he makes a presentation, the behavior is typical, he says. "Initially, they're argumentative and defensive." Frequently clients insist that because they've bought new PCs, they're compliant. Then his prospects want to roll back the clocks on their computers and forgo using the date. Barber reminds them that you can't have official correspondence without a proper date. "When I walk out of a room, nobody's breathing. They're all beet-red. They're completely overwhelmed. I tell them I don't have the time to sniff around and get business. If they want me, they have to call me. They always call me."

Barber's experience highlights an important lesson—make sure your contingency plans take into account all the agencies with which your company interacts.

—H. Baldwin

funding, so there's little motivation for cooperation. And they frequently make do instead of updating systems. "Overall they have very old systems on older platforms," says Barry Savage, the Austin, Texas-based vice president of conversions and migrations at IT services and consulting firm Computer Technology Associates Inc. "The code base has been maintained for lots and lots of years, and because of the attrition of [those who knew the code best], they don't often know they have problems." In his work with government agencies, Savage says he's encountered systems that are 30 years old. The older a system, the closer to spaghetti its code is likely to be.

To make matters worse, spreadsheets and desktop databases have given users outside the realm of IT the ability to build their own "stealth" applications, which IT is now left to remediate. "Smart users who are business folks, not IT folks, probably don't follow any rigorous standards," says Rick Bailey, director of application development for Health and Human Services, New Hampshire's largest state department. "What starts out as a database turns into a mission-critical application for that office."

Finally, at regularly scheduled intervals, the powers that be change. Elections that oust one party and bring in another are roughly akin to a hostile takeover in the private sector—no one feels particularly safe because newly elected officials usually bring in their own teams. In a spectacular case of bad timing, 13 new governors were elected in November 1998, compared with only four in 1996.

What's Really Going to Happen

The consensus is that there will be snarls, and citizens should be prepared for inconveniences (see chart on CIO.com for other specific advice). There may be power outages at certain public utilities, which frequently don't come under the IT purview in state government.

Those who rely on the government for social services are the most likely to be immediately affected. Social services departments are high on the list of mission-critical applications—and not only because they deliver checks to the needy. Imagine what could happen if the third instance of a child abuse report looked like the first because of an incorrect date. For the most part, businesses interact

with state government when the latter is licensing or regulating an industry; hence, the effects of problems probably won't be felt immediately.

But if you work with the government frequently, you should also be prepared for residual effects. "Organizations will continue to work on this problem for a long time," says Kolodney from his office in Olympia, Wash. "Many systems are not being fully fixed; they're being windowed. Ultimately, that catches up with you. You're going to have to replace it or fix it again. There will be work quietly going on for a long time."

Capital One's Donehey doesn't foresee a serious economic meltdown. "We should all expect some minor inconveniences," such as late mail and an occa-

sional lapse of phone service but not for protracted periods of time. For businesses, the effect might be increased taxation. "Somebody's going to have to pay for this, either upfront or after the fact," he warns.

Ask yourself this: When there have been technical snafus in your organization, hasn't your staff been able to handle them before they became embarrassments? The same may be true for the states. Almost everyone agrees there will be glitches but that they will be handled. As Michael Slater, director of IS and communications in West Virginia, notes, "It's a computer problem, and within this industry, we face them and deal with them every day." **CIO**

Senior Editor Howard Baldwin can be reached at hbaldwin@cio.com.

Gravy Train to Georgia

A scandal of sex and money rocks one state's Y2K remediation project

SINCE THE GEORGIA STATE LEGISLATURE GRANTED THE WISHES OF ITS Y2K project team, the state will end up spending more than \$300 million on its remediation. That's some \$50 million more than the Y2K budget of Texas, the state in second place (and \$50 million is more than some states are spending in total). Is there a connection between this astonishing budget and a flurry of conflict-of-interest charges that have rocked the state government's Department of Administrative Services? Hard to tell.

According to investigative reporter Dale Russell at WAGA-TV, the Fox affiliate in Atlanta, an Oracle Corp. employee named Pam Davis sold the state \$7.8 million worth of software database tools for the Department of Human Resources to keep track of the state's welfare programs. Oddly enough, there were no competitive bids, something most public agencies require, and the state bought enough software for 28,000 users, even though the DHR has only 14,500 computers. Not long after, Davis jumped from Oracle to PeopleSoft Inc. and sold the state that company's software for its Y2K remediation efforts and enterprise resource planning at a cost of several million. Davis sure sounds like an enterprising saleswoman, but there's at least one state employee who was involved in both purchases: Paul Mason, technology director for the Department of Administrative Services, who was romantically involved with Davis and is now her fiancé.

Although state executives have said that no one person can authorize such a large purchase, Russell also revealed that Mason's boss, Dotty Roach, commissioner of the Department of Administrative Services, is a close friend of Davis. Russell's broadcast sparked an inquiry by the Georgia Bureau of Investigation, which is still underway. Mike Hale, CIO of the state of Georgia, says dismissively, "The investigation has had little impact on our Y2K efforts. We have a new governor [Roy Barnes] who is emphasizing competitive bids, and that's part of the guidance that I'm acting on."

—H. Baldwin

State	Year Remediation Began	Proposed Date of Completion	Percentage of Work Done by 12/31/98	Y2K Budget (millions)	Full-Time Equivalents on Project	Lines of Code to Remediate ¹	Number of Applications Affected
Alabama	1996	6/30/1999	21%	NA ²	NA	40M	391
Alaska	1994	12/31/1999	45%	\$4	60	NA	NA
Arizona	1996	12/31/1999	71%	\$125	400	70M	227
Arkansas	1996	6/30/1999	65%	\$20	50	20M	55
California	1996	3/31/1999	80%	\$243	2,000	NA	650
Colorado	1997	6/1999 (most critical) 12/31/1999 (most others)	69%	\$34	115	NA	610
Connecticut	1996	3/31/1999 (mission-critical systems)	80% (mission-critical)	\$95	NA	NA	1,500
Delaware	1996	6/30/1999	72%	NA	30+	NA	102
Florida	1996	6/30/1999 (11/30/1998)	91% (11/30/1998)	\$90	563	35M	492
Georgia	1996	Varies by project	36%	\$322	1,672	100M	368
Hawaii	1996	9/30/1999 (11/30/98)	49% (11/30/98)	\$20.7 ³	NA	NA	854
Idaho	1996	6/30/1999	85%	\$19	NA	12M	1,100
Illinois	1996	12/31/1999	NA	\$114	NA	NA	337
Indiana	1997	6/30/1999	55%	\$27	88	14,500 (programs)	82
Iowa	1997	3/1/1999 (critical) 6/1/1999 (noncritical)	60%	\$36	150	58.8M	1,794
Kansas	1995	6/30/1999 (mission-critical)	86% (mission-critical)	\$26	125	16M	661
Kentucky	1995	7/1/1999	80% (mission-critical)	\$6.7	33	12M	241
Louisiana	1996	7/1/1999	34%	NA ²	NA	NA	535
Maine	1996	3/31/1999	75%	\$15	NA	3.7M	500
Maryland	1997	7/31/1999	70%	\$53	NA	NA	NA
Massachusetts	1997	10/31/1999	70%	\$53	NA	NA	285 (mission-critical only)

¹ Because it's not as easy to calculate "lines of code" in client/server applications as it is in Cobol-based mainframe applications, many Y2K project managers were unable to answer this question

² Agencies are using their operating budgets for Y2K remediation

³ \$20.7 million is the estimated cost to do Y2K remediation and testing for fiscal years 1998 and 1999



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State	Year Remediation Began	Proposed Date of Completion	Percentage of Work Done by 12/31/98	Y2K Budget (millions)	Full-Time Equivalents on Project	Lines of Code to Remediate ¹	Number of Applications Affected
Michigan	1997	3/31/1999	95%	\$55.6	415	25M	750
Minnesota	1996	12/31/1998 (mission-critical)	91% ²	\$28.7	NA	84M	1,300
Mississippi	1996	9/30/1999	75%	\$30	35 (from max. of 75)	NA	NA
Missouri	1997	6/30/1999	87%	\$57	125 (from max. of 300)	28M	255
Montana	1997	12/31/1999	53%	\$3.7	NA	NA	710
Nebraska	1996	12/1998	100%	\$20.7	60	10M	250
Nevada	1996	7/1/1999	54%	\$6	12	20M	NA
New Hampshire	1996	12/31/1999	40%	\$49.1	NA	NA	682
New Jersey	1995	6/30/1999	60%	\$50	1,500	100M	500
New Mexico	1996	12/31/1999	52% (9/1/1998)	\$6.5	NA	NA	530
New York ³	1996	4/30/1999	80%	\$117	NA	35M	709
North Carolina	1997	3/31/1999	37%	\$132	7,000	22M	1,150
North Dakota	1995	4/30/1999	90%	NA ⁴	20	4.2M	200+
Ohio	1997	12/1999	70%	\$61	300+	NA	270
Oklahoma	DECLINED TO PARTICIPATE						
Oregon	1995	7/1/1999	60% (legacy only)	\$102	150	59M	262
Pennsylvania	1996	12/31/1998	99.9%	\$40	389	NA	1,043
Rhode Island	1997	3/31/1999	NA	\$2.5 ⁵	NA	4M	6,500 (programs)
South Carolina	1998	7/31/1999 (mission-critical)	56%	\$32.4	600	38.2M	1,925
South Dakota ⁶	1996	7/1/1999	50% MF 32% PC 85% NW	\$3.7	22	23.5M	205 (MF) 1,500 (PC)
Tennessee	1996	6/30/1999	89% (mission-critical)	\$15.5	70	25M	329

¹ Because it's not as easy to calculate "lines of code" in client/server applications as it is in Cobol-based mainframe applications, many Y2K project managers were unable to answer this question

² Proposed deadline for completion has already passed

³ N.Y. has divided its remediation effort into four tiers: the top 40 systems, 324 high-priority systems, medium priority and low priority. These numbers reflect high-priority systems

⁴ Agencies are using their operating budgets for Y2K remediation

⁵ At press time, R.I. had requested an additional \$2.5 million

⁶ S.D. has broken down its Y2K effort by mainframes, PCs and network components

State	Year Remediation Began	Proposed Date of Completion	Percentage of Work Done by 12/31/98	Y2K Budget (millions)	Full-Time Equivalents on Project	Lines of Code to Remediate ¹	Number of Applications Affected
Texas	1995	8/31/1999	57%	\$256.9	1,447	229M	NA
Utah	1994	7/31/1999	65%	\$40	NA	NA	600
Vermont	1997	6/30/1999	65%	NA	100	NA	All
Virginia	1996	12/31/1998	86% ²	\$47.1	12	NA	NA
Washington	1995	6/30/1999	61% (mission-critical)	\$83.5	NA	100M	448
West Virginia	1997	12/31/1998	78% ²	\$5M	2 (from max. of 10)	NA	59
Wisconsin	DECLINED TO PARTICIPATE						
Wyoming	1996	12/31/1999	49%	\$13.9 ³	Unknown	25M	492

¹ Because it's not as easy to calculate "lines of code" in client/server applications as it is in Cobol-based mainframe applications, many Y2K project managers were unable to answer this question

² Proposed deadline for completion has already passed

³ At press time, Wyo. had requested an additional \$10 million

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The Bargain Hunter's Guide to

If you think VPNs are just for small businesses, think again. A surprising number of billion-dollar businesses are using the technology to extend their presence around the globe—and saving a bundle.

BY POLLY SCHNEIDER

Reader ROI

COMPANIES LARGE AND SMALL are experimenting with virtual private network technology overseas. Read on to learn

- ▶ Why VPNs are so cost-effective
- ▶ Why some companies rely on them entirely
- ▶ Where VPNs work best—and where they fall short



Global Net

Y

OU HAVE THREE MONTHS TO EXPAND YOUR CORPORATE NETWORK OVERSEAS TO SATISFY THE

chief executive's push for a global sales and distribution strategy. You could take the safe route and

buy a few more leased lines—but when you're talking about dozens of connections in places like

Mozambique and Tajikistan, is it really worth the cost and headache? Many CIOs are turning instead to

virtual private networking because it takes advantage of the Internet's reach while bump-

ing up its point-to-point reliability and security.



Although the technology is still immature,

a virtual private network (VPN) can slash

networking costs by 50 percent or

more. What's more, while it can take

months to install a leased line in certain parts of

the world, it's possible to add a user or office to a VPN in a day. The bot-

tom line: CIOs are finding they can lower the technical barriers to entry in

distant markets, where standard services like frame relay and T1 lines are

unavailable, unreliable or unprofitable.

The arguments about VPNs' value are clouded by disputes over definitions. Unfortunately

for the CIO seeking clarity, the VPN nomenclature is used to describe a whole knot of networking

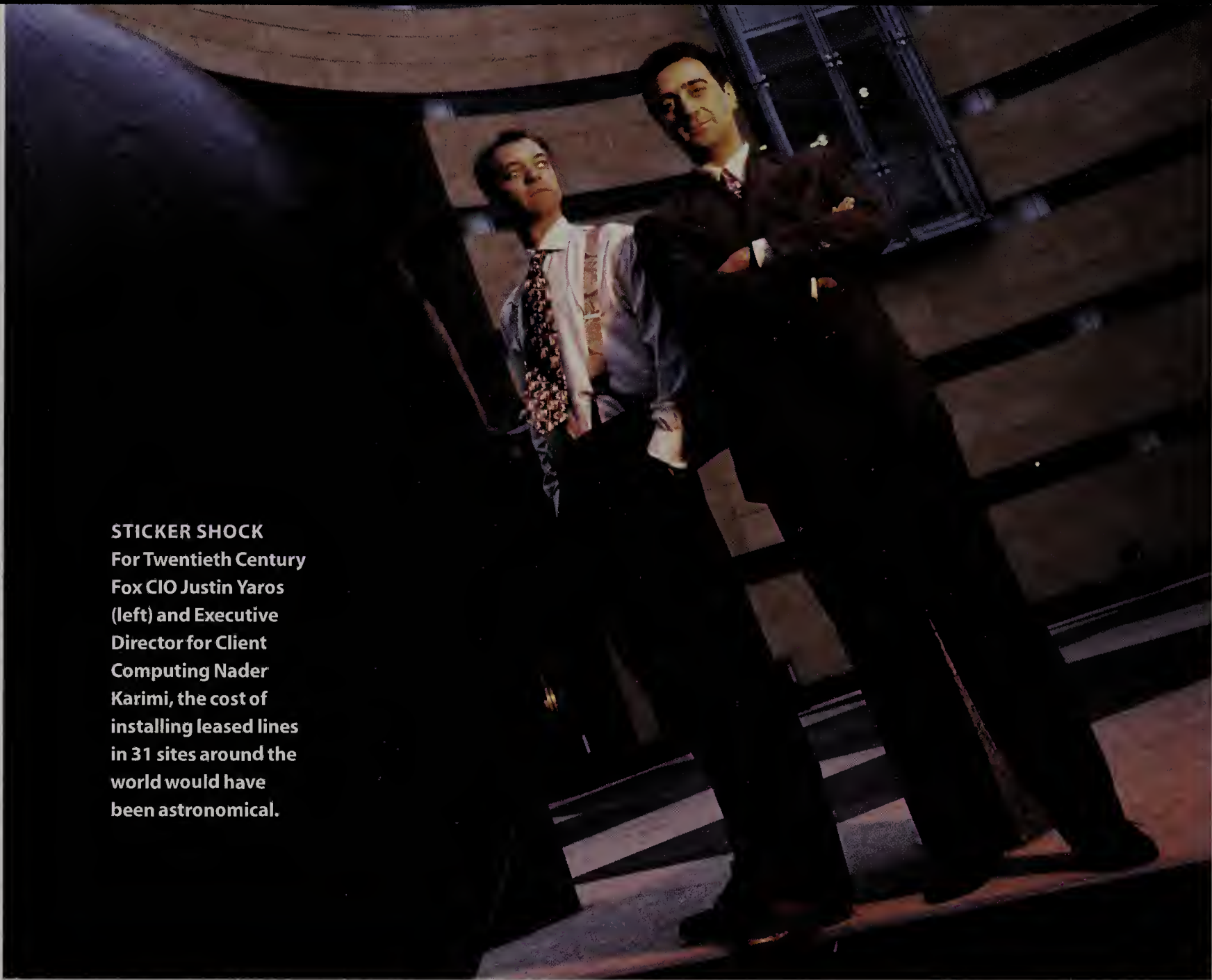
technologies: frame-relay services, secure Internet connections and private IP-based networks from "premium" network

service providers like Digital Island, IBM, CompuServe Interactive Services, GTE, Sprint, AT&T, UUNet Technologies or

MCI WorldCom (a few more are probably agitating in the spin factory right now). In this story, we define the VPN as a

simple point-to-point Internet-based network—the most popular form of the technology, according to Greg Howard,

senior analyst with Infonetics Research Inc. in San Jose, Calif., and other network analysts.



STICKER SHOCK
For Twentieth Century
Fox CIO Justin Yaros
(left) and Executive
Director for Client
Computing Nader
Karimi, the cost of
installing leased lines
in 31 sites around the
world would have
been astronomical.

Everything Old Is New Again

It may be the networking trend du jour, but the VPN concept is hardly new. Remember tie-lines back in the 1980s? Telecommunications providers connected private branch exchange (PBX) boxes between corporate sites, enabling services like four-digit dialing between campuses. But the whole thing ran over the public voice network.

Similarly, VPNs carve out a private tunnel in the shared, public network of the Internet, carrying data from a remote office to the corporate mother ship. They're cheaper than leased lines because users make only a local phone call to the nearest access-point, or point of presence, of a service provider (whether network or Internet). Because leased lines are

priced on the distance between their end points, the savings for international sites rerouting onto the Internet can be astronomical.

While it works well for branch offices, the technology is also becoming popular for mobile workers. Typically, users dial a long-distance or toll-free number

from their laptops to access the corporate network—which is not only expensive but a management nightmare when modem banks and remote access equipment require upgrades or troubleshooting. With VPNs, road warriors require only dial-up software (part of Microsoft Windows 95 or available in standalone packages), VPN software and an Internet account. The Internet service provider (ISP) takes care of the rest.

Using a VPN for remote access, a company with 350 users and 31 hours of connection time per user per month can save \$525,000 annually, according to Infonetix analyst Howard. While network providers like IBM and CompuServe also offer remote access services enabling local dial-up to their private frame-relay networks, the cost savings are not as great as with an Internet-based VPN. The ability to have users dial in through the Internet from places other than a branch office has inspired CIOs to consider VPN technology as a platform for connecting to partners and suppliers. "Imagine trying to connect 10,000 third parties," says Dan Merriman, vice president at Giga Information Group Inc. in Cambridge, Mass. "That would be a nightmare with frame relay or private lines. With the Internet, all you do is ship out your IP address and you're off and running."

The following stories illustrate that while your network doesn't have to make your head throb, VPN is not a miracle drug. As is evident in the sidebar, "Where VPNs Fail" (Page 55), the industry has yet to resolve some of the problems inherent in the technology. And even Merriman admits, "I don't see the Internet replacing everything but evolving to fill in this nice continuum where you'll have different options."

More on VPNs

Previously in CIO...

Tunnel Visions by Suruchi Mohan,
CIO Section 2, May 1, 1998
[www.cio.com/archive/webbusiness/
050198_vpn_print.html](http://www.cio.com/archive/webbusiness/050198_vpn_print.html)

Look but Don't Touch by John
Edwards, CIO Section 1, Feb. 15, 1998
www.cio.com/archive/021598_et.html

PHOTO BY MARK ROBERT HALPER

TWENTIETH CENTURY FOX

Making Remote Offices Less Remote

Twentieth Century Fox Film Corp. raked in record revenues of \$2.7 billion in 1998, thanks to films like *Titanic*, *There's Something About Mary* and *The Full Monty*. Still, CIO and Senior Vice President Justin Yaros didn't want to spend all of Rupert Murdoch's profits on a new network, and he's banking on a VPN to keep costs down. As demand for the company's films, home videos and interactive games surged over the last two years, the presidents of Fox's international businesses lamented their lack of tools to set strategy across regional offices around the world. To address this, Yaros envisioned a \$10 million suite of Web-based enterprise systems supporting sales, marketing, finance and distribution, set to be in place by 2000.

But the cost of installing leased lines in all 31 international sites left Yaros with sticker shock. "It would have changed the entire economic model of these projects," he says. Instead, Fox is connecting the sites to corporate headquar-

ters with 128Kbps dedicated connections to UUNet's Internet backbone, using Novell Inc.'s Border Manager VPN product. The London, Mexico and Tokyo offices are already up, and 18 more sites are scheduled for deployment this spring. Employees are using the network to access e-mail, the Internet and customer, sales and other business data from Fox's servers in Los Angeles.

The Tokyo office is a shining example of how a CIO can shave the monthly telecom bill. Fox is paying \$350 a month in charges to a local ISP, considerably less than the \$7,000 to \$9,000 a leased line would cost, says Nader Karimi, Fox's executive director for client computing services. Karimi predicts the company will save at least \$600,000 a year in e-mail transmission and file sharing costs from the first 21 sites—even after spending \$6,000 to \$8,000 to install new equipment at each site. Karimi's staff will also be able to monitor the network from Los Angeles, which will help the company maintain its goal of 99.9 percent uptime.

Still, both Karimi and Yaros acknowledge that the VPN is no silver bullet. Because of security concerns on the Internet, Fox will maintain a leased line to parent company The News Corp. Ltd. in Sydney, Australia, for the exchange of confidential financial data. It's also keeping its

CompuServe dial-up lines in place as a backup for recovering e-mail and will configure the network to route data through other hubs such as London in case the Los Angeles connection fails. Yaros says the VPN has not caused performance problems. Managing expectations, however, is another story. "People think they can send a 10MB PowerPoint presentation now that they have a network connection," Yaros laughs.

If all goes well, Fox will extend the VPN to its distributors and joint venture partners around the world and may even consider a VPN for telecommuters in the United States. More important, says Yaros, the VPN is providing the roots for a companywide intranet that will create a global community for Fox's thousands of international workers who are largely isolated today.

KNOWLEDGE SHARING
Enno Becker, director of technology infrastructure for Forum, has pushed his network to handle video-conferencing, online learning and real-time collaboration.

PHOTO BY FURNALD/GRAY

FORUM

The Intranet Becomes an Extranet

While Fox is a big company using VPN on a small scale, The Forum Corp. is a small company using VPN on a big scale. A Boston-based global training and consulting firm, Forum is relying on a VPN to network both internal and external users. Several years ago, Forum's

VIRTUAL PRIVATE NETWORKS

customers began to demand training programs that would serve their employees anywhere in the world. To do this efficiently, Forum needed a way for its 350 staff members to share knowledge. At the time, the company relied on the only methods it could afford: fax machines and a few carefully located integrated services digital network (ISDN) connections.

The company established a VPN linking its Boston, Hong Kong and Toronto offices in early 1997 and added a link to its London office in early 1998. Initially, salespeople, consultants and software developers used the network for e-mail, intranet and file access, order processing, financial tracking and technical support. More recently, Forum added real-time collaboration, videoconferencing and online learning to the VPN. "At the time, we didn't even know it was a VPN," chuckles Enno Becker, Forum's director of technology infrastructure. Today Forum's VPN supports all applications and communications (with the exception of telephone and fax) between the U.S. and international sites, and it's also bringing the company closer to its customers and suppliers.

Using security technology from Check Point Software Technologies Ltd. and Internet access with UUNet, Becker killed two birds with one stone. The VPN provides the same 128Kbps bandwidth as the ISDN line in the Hong Kong office, but at roughly \$3,000 in monthly ISP fees compared with the \$9,000 monthly ISDN bill. In London, a larger, busier office where speed is more important, Forum was able to quadruple the bandwidth from 56Kbps to 256Kbps between its office and the ISP for an added cost of only \$1,000 a month. Such improvements in speed and the resulting productivity boost help Forum be more responsive to its clients, Becker says. The one caveat, however, is that companies can control the bandwidth only from their sites to the ISP on both ends of the connection. In between, data is subject to the whims of the public Internet.

Most recently, Becker allowed several of Forum's customers and software development partners to collaborate in real-time on the development of training software over the VPN, essentially using it as an extranet. "Having secure connections with our customers is the thrust behind our ability to provide online learning," he says. Users can test software, access technical documents, run customer demos or download information from Forum's servers.

A simpler, cheaper and more accessible network may allow small, growing companies like Forum to stay nimble and win business in new markets. Becker says it's only a matter of time before Forum has standardized all its networking on the VPN, allowing users to connect directly to the Internet and headquarters from wherever in the world they may be.

BLACK & VEATCH

Staying in Asia, Despite Hard Times

Forum's ability to base its entire network on a VPN is the exception rather than the norm, of course. For bigger companies, VPN technology works best as a stopgap. Black & Veatch Corp., a \$1.8 billion engineering construction company for the power industry, is using a VPN to meet a temporary but urgent need. When deregulation in the U.S. market slowed growth in construction of new power plants five years ago, Black & Veatch began to look overseas for customers. The company now earns 55 percent of its revenues overseas, primarily in Asia, South America and the Middle East, where demand for new plants is still growing rapidly.

However, with the Asian financial crisis of 1997 and 1998, business in the region suffered. Black & Veatch wanted to keep its Asian offices open but needed to economize wherever it could. Frank S. Becker, client services manager with Black & Veatch Solutions Group (the company's former IT department, now a subsidiary), decided that a VPN would make a thrifty alternative to leased lines in its smaller offices. "What would cost \$1,000 a month here would be \$11,000 in Asia," he says.

The company set up a VPN in its Indonesia, Singapore and Thailand offices, letting them dial in to a local ISP. Because it used the point-to-point tunneling protocol (PPTP) built into the Windows operating system, Black & Veatch didn't have to buy additional software. The Solutions Group administers the network remotely from corporate headquarters in Kansas City, Mo. One hundred employees are now using the

ALTERNATIVE NETWORK

To avoid higher telecom costs and still serve smaller offices in Asia, Black & Veatch Client Services Manager Frank Becker switched them to virtual private networking.

Where VPNs Fail

Before you decide to replace your global network with a VPN, consider the potential roadblocks

Shaky performance. While the big ISPs that carry traffic entirely on their own backbone can guarantee some level of reliability and response time, most analysts warn against using VPNs for real-time interactive customer applications or transaction processing. "I think the gating factor is not security anymore but performance," says Edward M. Roche, vice president and research director of The Concours Group, a research, management consulting and education practice in Kingwood, Texas. "With frame relay you can buy performance and get 100 percent guarantees. With the Internet, you can't do any of that."

Security and standards. Strong encryption is widely available, and sophisticated network monitoring tools can alert companies to potential weaknesses before hackers find them. The real problem lies in exporting encryption engines outside the country. Regulations in some countries require stronger products than U.S. export regulations allow (40-bit for most industries); others don't permit encryption at all. A lack of standards for interoperability between VPN software is also an impediment for companies wishing to extend the VPN to partners, suppliers and customers. Greg Howard, senior analyst with Infonetics Research Inc. in San Jose, Calif., says this will block the growth of VPN-based extranets for at least another year.

Management challenge. Trying to set up the encryption for his company's VPN kept Enno Becker, director of technology infrastructure at The Forum Corp. in Boston, awake an entire night in London. And Microsoft's point-to-point tunneling protocol (PPTP) for dial-up users has been a bear to install and maintain. Often, companies have little support from the vendors, Becker adds. "In the case of frame relay, if something breaks, it's usually the telecommunications provider's responsibility," he says. While Forum decided to keep its technology in-house, CIOs can outsource the VPN to the network service provider and eliminate these problems.

—P. Schneider

VPN as their primary network for Internet and intranet access, sending e-mail and downloading marketing and financial data from Kansas City. Becker says that for the Jakarta office, the VPN costs around \$40 per person in monthly ISP charges. For those 25 employees, that comes out to about \$1,000 a month.

The VPN is not an option for offices with users who need to access Black & Veatch's proprietary engineering design software (for which Black & Veatch won a CIO Enterprise Value Award; see "Reengineering the Engineering Business," *CIO* Section 1, Feb. 1, 1998). The software was developed as a client/server application, which Becker says would bog down the VPN. In the meantime, the company is working on a browser-based version of the system that could feasibly run over the VPN someday. When employees travel, they use IBM's network for remote access rather than the VPN because IBM's dial-up software is easier for users than finding numbers for the nearest ISP, Becker says. Even so, the company is still saving anywhere from 50 percent to 70 percent with IBM by avoiding long-distance charges.

Running a mixed network gives the company more flexibility and is well worth the added complexity, according to John Voeller, chief knowledge officer and senior vice president for Black & Veatch and chief technology officer for the Solutions Group. Applications like the engineering software that require the bandwidth and reliability of a leased line are costly, he says, but those costs are now offset by inexpensive VPN technology for users who need access only to the intranet or e-mail.

Is There a VPN in Your Future?

If you believe what the pundits say, everybody who's anybody will be doing the VPN thing before long: Infonetics' Howard predicts that the total market for VPN products and services will balloon from an estimated \$755 million in 1998 to \$5.75 billion by the year 2000. However, for large enterprises a VPN may simply provide redundant links with foreign subsidiaries in case the leased lines fail, Howard notes. In industries like health care, security concerns are still so high that VPNs haven't been a cure for much yet.

Forum's Becker gives three pieces of advice for VPN pioneers. First, choose a reliable ISP that can provide Internet access everywhere; using a single vendor avoids security and performance problems that may stem from hopping between ISPs. Second, for an easier implementation, stick with a single VPN vendor that incorporates firewall and encryption tools in one package. Finally, remember that simplicity enhances security: Avoid extra features from the vendor, and assign only one password per user.

Even as the world shrinks, it becomes apparent that no one networking infrastructure fits all companies, or even the same company in different regions. By using VPN technology as a flexible component of their global networks, CIOs can adapt their strategies as needed, quickly and inexpensively. **CIO**

Senior Writer Polly Schneider can be reached via e-mail at pschneider@cio.com.

WHAT YOU DON'T KNOW CAN HURT YOU

Hot Potato

Vendors and integrators like to dump hardware sizing risk in the CIO's lap. Don't let them.

BY WAYNE D. BENNETT

YOU HAVE BITTEN THE BULLET and embarked on an enterprisewide system implementation project. Odds are, if your organization is big, it will be SAP or Baan or PeopleSoft sitting atop Oracle or Informix, which will run on IBM or HP or Sun boxes. Your budget is tight, but your integrator (Andersen, KPMG or any of a score of others) assures you that so long as you keep custom work to a minimum, you will make it.

Then comes the contract, which calls for workmanlike work but has no assurances that the whole mess will operate as expected. In fact, you are a little stunned by the exhibit entitled "Roles and Responsibilities," which seems to allocate more work to you than to the consultant. From the outset, it is clear that this will be an adults-only swim. You are so focused on the millions being spent on software and implementation (and the corresponding fuzziness about all things other than payments) that you downplay the hardware risk. But how do you know that the hardware recommended by the integrator will handle your expected volumes? Not only are vendor assurances conspicuous by their absence, there's a nasty little clause toward the end of the vendor's contract. It says that the integrator (usually called the "consultant" for reasons that become obvious) is not responsible for the hardware sizing risk—you are. And more often than

not, you sign this clause after satisfying yourself that you are buying state-of-the-art hardware capable of more millions of instructions per second (MIPS) than any box you currently own. Alternatively, you can hire a third party to validate the hardware sizing. Your goal should be to buy a functioning system, not just a good-faith effort to stay within your budget.

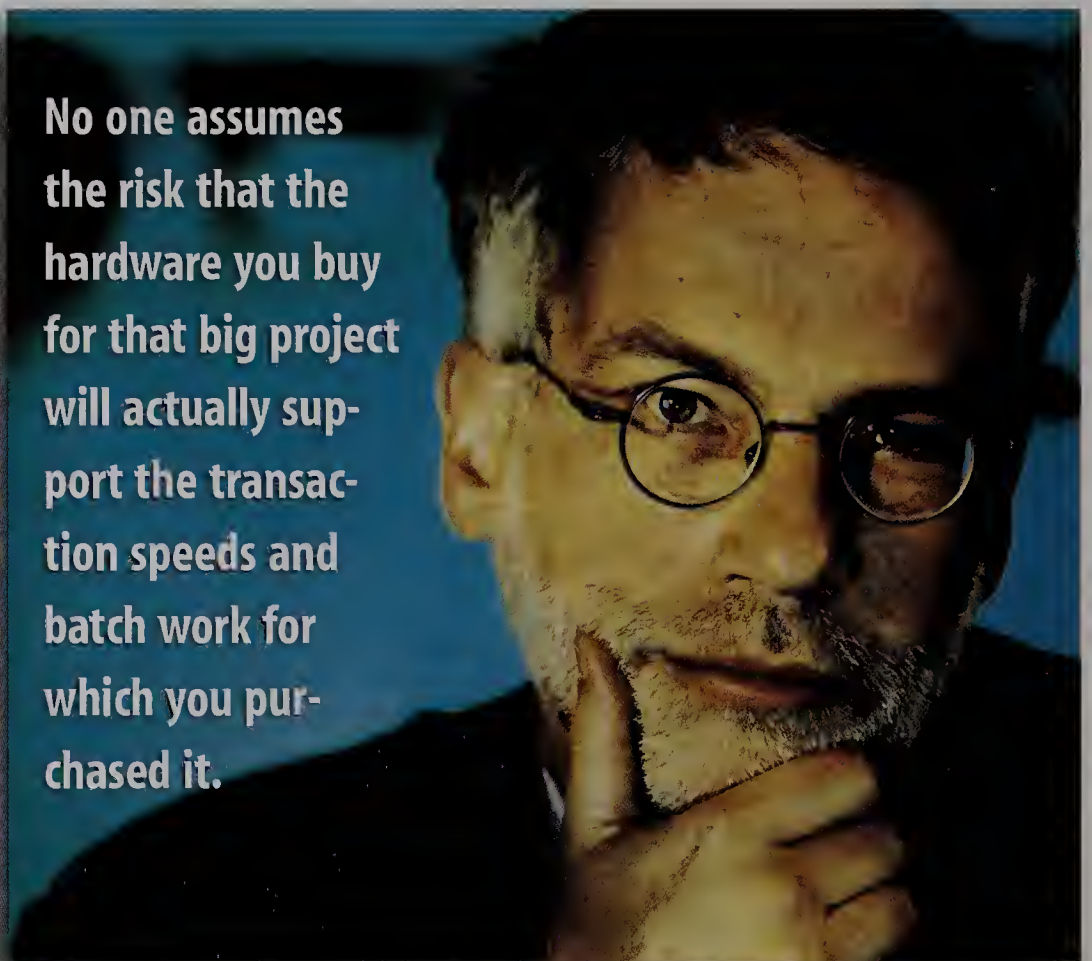
MIPS shmips. Of all the unseemly little secrets in enterprise projects, one of the most unseemly is the hardware sizing risk. Decades of major software

integration projects have created a tradition without even the prospect of progress. No one—not the hardware vendor, not the software vendor and not the integrator—assumes the risk that the hardware you buy for that big project will actually support the transaction speeds and batch work for which you purchased it. And any risk not assumed by the vendors is left squarely with the customer.

Vendors have terrific reasons for this. IBM, Sun and Hewlett-Packard don't know how bloated the software will be. SAP and Oracle can't anticipate the custom work to be performed by KPMG or Andersen. And your consultant wants to be your adviser, not your integrator. All you want is for someone to tell you that after you pay millions of dollars, your people won't grow old and die waiting for response times and that the overnight batch work won't require an Arctic winter night to finish.

This pitiful tradition began simply enough with an observation made by

No one assumes the risk that the hardware you buy for that big project will actually support the transaction speeds and batch work for which you purchased it.



CORNER IMAGE BY CARL TREMBLAY; PHOTO BY GEORGE SIMIAN

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The newest S/390, G5, can handle 400 million transactions a day.

MASSIVE SCALABILITY, RITE AID.

How big e-business will get is anyone's guess. Rite Aid, www.RITEAID.com, which operates an enormous network of 3,900 retail sites across the country, is planning for the best. They use IBM S/390 to handle the merger of new store locations with their existing IT infrastructure.

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YEAR 2001, 2002,
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Fine Print

a software engineer just after the earth cooled (this reporter heard it first in 1975): "Hardware is getting cheaper by the minute."

True enough, but it still ain't cheap, and software and traffic seem to bloat at a rate that dwarfs the downward spiral of hardware prices. In other words, it still costs you at least as much to perform the same business functions you did a decade ago, Moore's law notwithstanding.

The hardware manufacturers all have their queuing models and will be glad to help your consultant size the hardware, but they give no assurances because their models are all based upon use levels (functions and volumes) that may not represent your use. (Skeptics argue that

ties, including yourself, you need to make this known in the request for proposal (RFP). And then you need to hold the integrator accountable in the contract. It will cost you more to offload this risk, but it should not cost you a lot more. Predicting computer performance using real-world parameters can cost you a fair amount (and ought not be attempted for modest implementations), but it is money well spent in advance of big projects.

Almost invariably, you will learn that processor speed is not a bottleneck. In many cases, you will learn that you are being asked to overpurchase processor speed. Storage access is another issue. Once your workload is simulated, vendors start recommending a second (or subsequent) database instance, which can have

tual volumes exceeded expectations. Integrators breathe a sigh of relief whenever this occurs. But the question that still haunts the CIO is whether the originally bid hardware would have handled the originally predicted volumes or the vendor just skated because of the customer's failure to predict correctly.

To those who say the matter is more complicated and not susceptible to relatively straightforward calculation, I say you have been sold a bill of goods. That bill of goods is the vendor's first line of defense. The second line of defense is the argument that by shifting any of the sizing risk to the vendor, you are forcing the vendor to overbid the hardware just to ensure that you do not have a sizing claim against the integrator. This is a

Unfortunately, few integrators are ready to share the sizing risk.

Freed from this obligation, many make no effort to familiarize themselves with the sizing process or, more important, the architectural solutions to the problem.

the hardware vendors' assumptions do not actually occur in nature.) Not only does the hardware vendor have no skin in the game, the vendor's incentives are antithetical to yours. Once you buy into an architecture for a million or more, you're in for life. Or, counting in CIO lives, you're in for multiple lives.

We're not talking about predicting response times to the nearest tenth of a second. All your organization wants to know is whether the hardware will support the functions and volumes enough to provide reasonably fast response times and if it's capable of completing overnight batch work without cramping maintenance activities or the start of the next business day. Your expected volumes are reasonably predictable in business functions (number of invoices, etc.) and, while your consultant may not know the full extent of customization needed at the outset of the project, any consultant who has done more than a handful of implementations can determine the variance among implementations. With these fairly rough parameters, existing sizing programs are capable of making some decent predictions.

Your integrator should share some of the sizing risk. But to be fair to all par-

reasonably expensive ripple effects throughout your architecture. After you learn the expected overnight batch turnaround times (hopefully long before anyone starts coding), you can explore real architecture changes, such as parallel processing, where appropriate. These are choices that should be considered at the front end of the project, not when you start experiencing problems.

Unfortunately, few integrators are ready to share the sizing risk. Freed from this obligation, many make no effort to familiarize themselves with the sizing process or, more important, the architectural solutions to the problem. Even in completely plain vanilla enterprise resource planning (ERP) projects (for example, SAP/Oracle with no customization), integrators rarely step up to the hardware sizing risk.

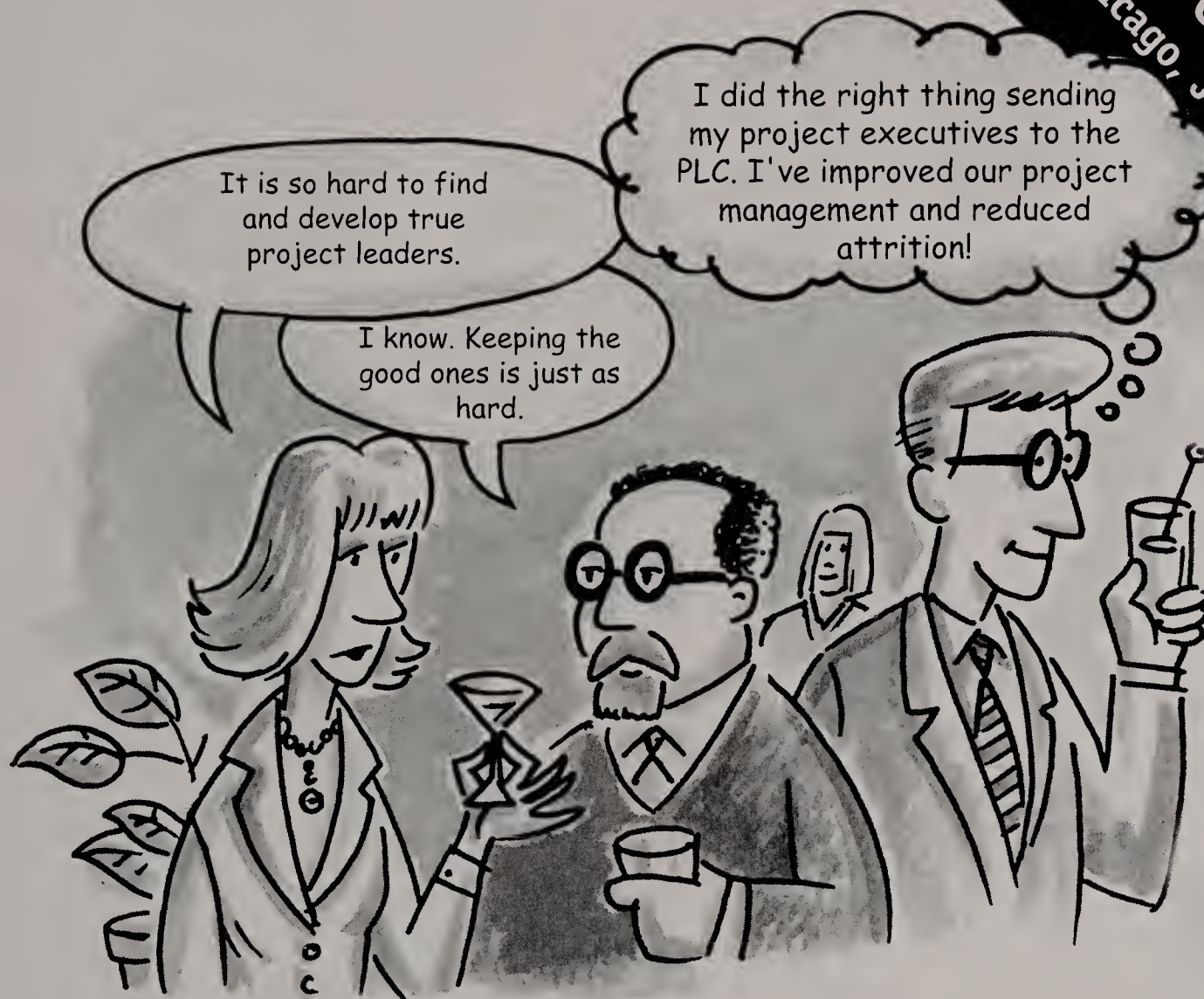
With all of the studies done to date regarding ERP projects, it would be fascinating to learn how many were forced to substantially increase their hardware investment after they were knee-deep into the project, thereby using precious (or nonexistent) contingency funds in their ERP budgets. My guess is that the overwhelming majority ends up doing this. In many cases, fast-growing customers will acknowledge that their ac-

powerful argument that underscores the need to identify the obligation at the outset (in the RFP) so that you can analyze competing bids on an even playing field. If you wait to spring this obligation until after you have selected the preferred vendor, a more elaborate contractual scheme of risks and rewards must be constructed for everyone's protection.

Like any other risk that is allocated in a contract, you may end up assuming or keeping the hardware sizing risk. But do not start from the vendor's preferred position that the risk is absolutely not allocable to anyone but you. **CIO**

This column introduces Wayne D. Bennett, chair of the Commercial Technology Practice Area in the Boston office of the law firm Bingham Dana LLP, as a regular contributor to CIO. Bennett is a former mathematician, a software developer and CEO of a software company, and he has lectured widely. CIO believes that few attorneys can spot legal landmines that are buried between every CIO and his business goals as well as Bennett can, and even fewer are willing to give us the straight dope about motives that are often hidden in the fine print of legal documents. Bennett can be contacted at fineprint@cio.com.

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Emerging Technology

THE STATE OF THE ART,
NEW PRODUCTS
AND STAYING AHEAD
OF THE CURVE

Edited by Howard Baldwin

Making Human Resources More Resourceful

*With these new solutions,
you can kick-start your HR
software's capabilities*

BY ALAN S. KAY

HISTORICALLY, HUMAN RESOURCES organizations have been judged more by their ability to manage costs than by their ability to manage human assets. As a result, HR software has focused on automating routine administrative tasks, such as payroll and benefits tracking.

Just as IT's role in the organization has been changing, so too has HR's, as companies seek to fine-tune their legacy HR databases to support business goals such as rapid hiring, increased retention and analyzing current and future human capital resources and needs. Software vendors are only too happy to help with that tuning by supplying external tools—accessories, if you will. The recent trickle of new strategic HR applications is rapidly swelling into a flood.

Moving from Tactical to Strategic

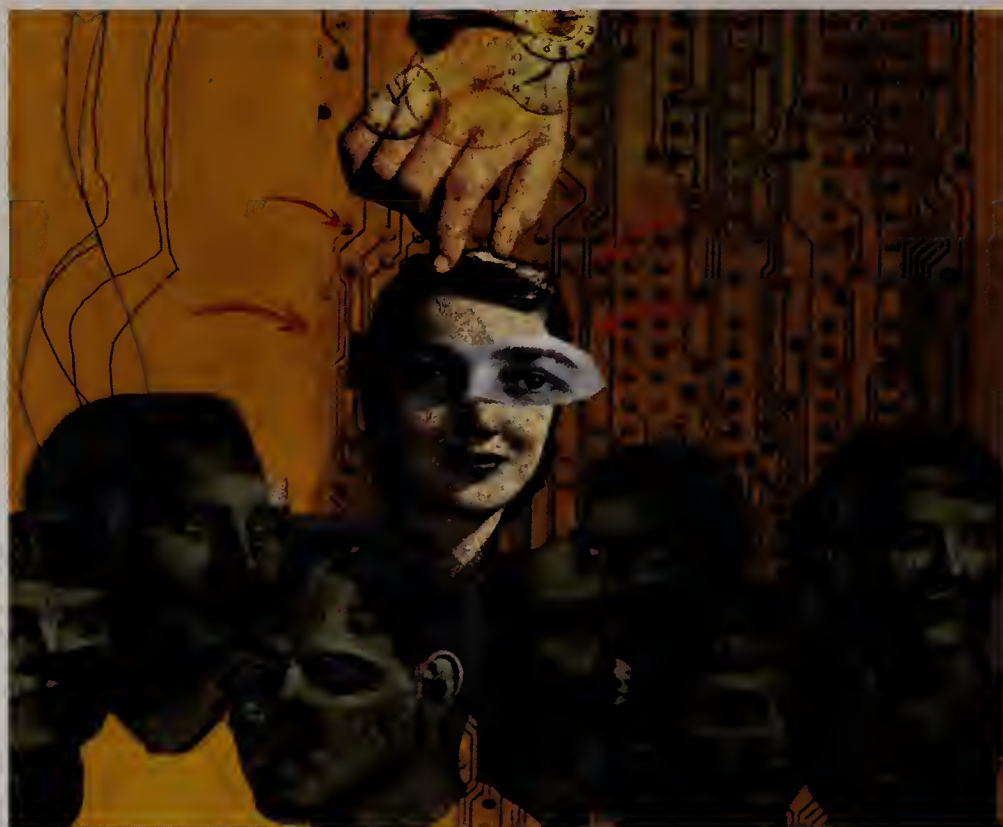
The typical company's typical HR management system wasn't designed as an agile strategic tool. It was geared more toward payroll and benefits automation than toward matching competencies to tasks or

empowering employees. In fact, Forrester Research Inc. reported in May 1998 that in 52 Fortune 1000 companies, between 60 and 80 percent of HR's time and money was devoted to administrative tasks, while only 20 to 40 percent was devoted to strategic tasks.

For companies to remain competitive, that ratio needs to shift. Companies are finding they must

reduce costs and increase the contributions HR makes to the bottom line. Your HR managers may have already enlisted the IT department's help—not only to automate recurring processes but also to speed recruiting and improve employee development, performance management and succession planning. The goal: systems that effectively manage the human capital in the company and differentiate the business in the marketplace.

After discovering that the administrative activities of its HR operations matched the results of the Forrester survey, pharmaceutical giant Warner-Lambert Co. in Morris Plains, N.J., undertook several HR reengineering projects to reach that goal, reports Tim Huelsman, the company's vice president of global reengineering. He wanted to transform the human resources department from a transactional, tactical group to a strategic, consultative organization. In the new scheme, Huelsman says, HR professionals are to become facilitators of change, people who help deliver competitiveness and profitability.



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Emerging Technology

Out to the User

With the delivery of business value in mind (along with a desire to cut administrative costs), companies are centralizing HR services. Through a Web browser, employees can access and update HR data from their desks or home, and line managers can do personnel-related tasks without the assistance of an HR professional.

Using Employee Service System technology from Edify Corp. in Santa Clara, Calif., and its own legacy HR systems, Warner-Lambert has introduced systems dubbed Colleague Self-Service and Manager Self-Service. Through a Web interface, an employee can change his or her address and phone number; update beneficiaries after marriage, divorce or births; and report new skills or degrees obtained. The resulting increased information flow will be of strategic value to the company, says David Erickson, former director of HR systems who is now vice president of HR shared services. "The more we begin to search for internal candidates for open positions," he adds, "the more information we need to have about individuals—and the more they can provide."

At Honeywell Inc. in Minneapolis, Application Development Specialist Bill Davini oversaw the deployment of TrackWell, an HR call center using software from Quintus Corp. The call center centralized HR servicing previously handled by departments in each of the company's three strategic business units. The Quintus package allows customer service reps to consult onscreen retirement benefits data drawn from two legacy HR systems and the company's PeopleSoft installation. As a result, they're able to answer questions quickly and accurately.

Tools for Strategic Alignment

Improving employee access to HR information is an important step. In these days of low unemployment rates, however, HR needs to be able to align itself with the business strategy. It needs accessories that deliver value in areas such as applicant tracking, recruiting, competency management, training administration and performance management.

Design of the Future

It's not Star Trek's virtual reality Holodeck, but HP's Visualize Center comes close

HOW DO INDUSTRIAL DESIGNERS get inside a prototype to see how well everything fits together before it's built? They don't. But Hewlett-Packard Co. is working on changing that with Visualize Center, a virtual reality system that provides an "immersive environment." Powered by a whopping three synchronized work-

stations (incorporating six 236Mhz PA-RISC processors, six 9GB hard drives and 3GB of RAM), the software allows design teams to walk

at a wing on a wall versus looking at a wing on a 21-inch monitor." Virtual reality helps designers better understand how a system's various parts fit together and interact with each other, says Ian Graham, director of engineering operations for Computer Sciences Corp. and a consultant to General Motors Corp.'s London, Ontario-based locomotive group, one of Visualize Center's beta testers. "The system enables organizations to visualize very large types of assemblies, such as drive-trains and engines. It's something that [desktop] 3-D modeling has promised but failed to

deliver for large-scale manufacturing organizations."

Visualize Center will likely appeal to companies with development teams spread over large geographical distances, says Jim Garden, director of technical services for Technology Business Research Inc., a mar-

ket research firm based in Hampton, N.H. "You can't afford to fly a couple hundred engineers across the pond just for a review meeting. Now they can just pass the file and review it at each end or simultaneously."

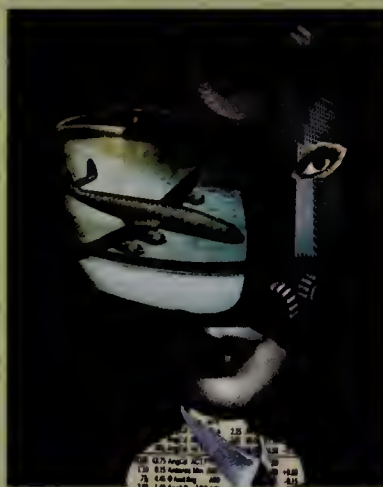
As more powerful processors arrive on the market, it will eventually become possible to render even larger and more detailed systems in VR, predicts Graham. "The aim, in maybe the next two or three years, will be to visualize a very large, complex product like a whole aircraft or car in full detail. It will actually enable users to completely eliminate the costly prototyping stage that many organizations still go through to hone their design."

—John Edwards

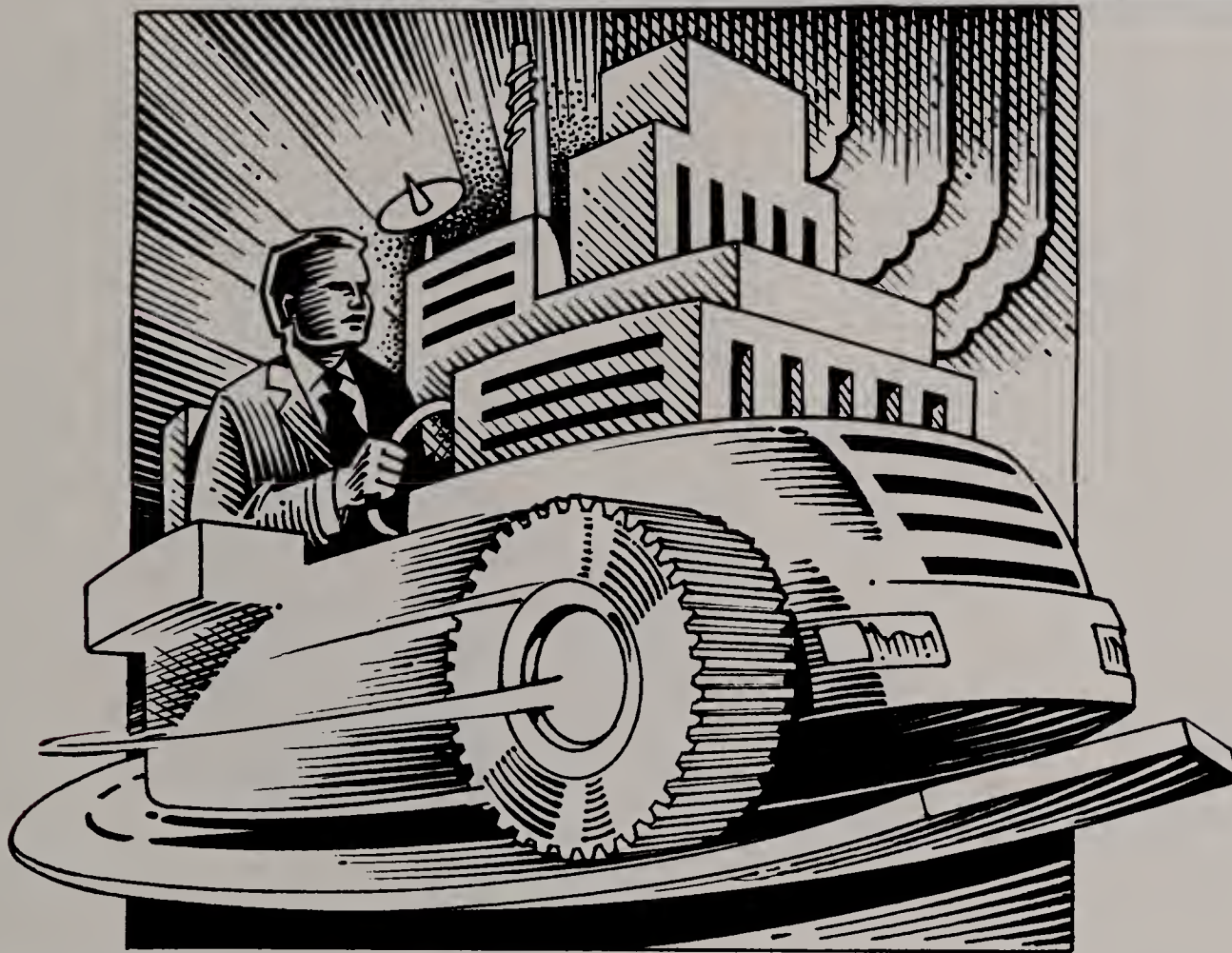
VIRTUAL REALITY

stations (incorporating six 236Mhz PA-RISC processors, six 9GB hard drives and 3GB of RAM), the software allows design teams to walk through life-size vehicle, aircraft, architectural and industrial assemblies before building a physical prototype. A 28.4-foot by 8.6-foot VR Briefing Center, about the size of a classroom, features curved display screens, while a design-team-oriented 18.11-foot by 5.8-foot Immersive Visualization Center, the shape of a giant shoebox, has flat screens. System prices start at a cool \$460,000.

Visualize Center aims to free designers from the display restrictions of conventional desktop monitors, says Vern Rhead, HP's Visualize product manager in Fort Collins, Colo. "It allows teams of engineers to get together to review these very complex designs in real-time at a human scale." The technology cuts costs by providing a fertile ground for enhanced collaboration and lessening the need for expensive redesign work, notes Rhead. He adds that the system can also accelerate design breakthroughs. "It's a completely different insight looking



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Emerging Technology

That's more than just a set of catchy phrases, says one respected Boston-based HR executive. "I need to be able to make much quicker decisions—to get an offer out to an applicant before the competition does," insists Sue Schoonover, vice president of staffing services in the global human resources department at State Street Corp., the parent company of State Street Bank. "Companies like ours need capabilities like e-mail notification and workflow tools so that we can reduce some of the previously time-consuming administrative activities—getting signatures, for example." The integrated systems she's using can reduce the time it takes to fill a job by days, or in some cases, by weeks.

The market for strategic HR applications that interface with and extend the traditional enterprise resource planning (ERP) packages is still evolving. Jenni Lehman, research director for administrative applications strategies of technology at Gartner-Group Inc., sees these "bolt-on" products emerging at the edges of the HR market, in areas such as recruitment and workforce management. Their development is being accelerated by advances in Web implementation.

But while many small tools eventually become subsumed by the larger systems, that may not happen this time around. What we will see, Lehman says, is a bifurcation of the market into large, broad products, usually part of an ERP suite, that offer limited depth of functionality, and at the other end, very targeted products featuring implementations of new technologies. What's the appeal of these products? "You've done a \$5 million SAP implementation, but there's still one piece of automation that's not done," suggests Lehman. "Do you extend that huge SAP implementation, or do you do a quick and easy bolt-on product implementation that doesn't require 60 consultants?"

Much of the activity in strategic HR applications has been in the area of recruiting and hiring. Companies with roots in resume management (Interactive Search Inc., Restrac Inc., Resumix Inc. and SkillSet Software Inc., for example) are competing with companies offering "workforce planning" capabilities (HR Technologies Inc., Icarian Inc., PeopleMover Inc.). HR groups are taking advantage of both kinds of packages to juice up what can be an agonizingly slow process for both the applicant and the manager with a position to fill.

At Analog Devices Inc. in Norwood, Mass., for example, Human Resources Strategy Partner Deb Deputat says the company has automated employment management using Deploy Solutions Inc.'s Employ collaborative hiring system. This workforce planning and hiring workflow package integrates and automates the end-to-end hiring process

LEADING

EDGE

Dexterity Not Included

IF THERE WERE EVER an opportunity to get rid of the antediluvian QWERTY keyboard, you'd think it would come with the announcement of a pager with keys and a screen for instantly answering pages. But no. Research In Motion Ltd.'s **Interactive Pager 950** (or as the company calls it, Inter@ctive) is the size of a traditional pager, but it features a miniature keyboard and backlit LCD for messages. Oh well, you can't have everything.

On the other hand, you do get a messaging application that lets you send e-mail, faxes, alphanumeric pages and even text-to-voice messages (up to 16,000 characters). Its



address book stores up to 1,000 addresses. A thumb-operated roller operates the same way as a PC's mouse, and the pager is powered by a 32-bit 386 processor with 1MB of flash memory and 304KB of RAM (we mention this only because this pager is more powerful than the first PC). RIM estimates three weeks of usage on a AA battery. The pager costs \$359 and requires BellSouth's Interactive Paging Service in the United States, which starts at \$24.95 per month. For more information, call BellSouth at 888 423-9663, RIM at 519 888-7465 or visit www.rim.net.

Brainiac, Part II

THIS SOUNDS AMBITIOUS. Combining the idea of neural networks (networks that learn from their own activity) and intelligent agents, Computer Associates International Inc. has come up with the concept of Neugents. Once they've absorbed historical data, these applications can analyze, predict and even suggest future courses of action. Initially, Neugents will target performance availability problems on a computer network in **Unicenter TNG Neugents**. It combines multidimensional pattern recognition based on historical data with the power of Unicenter TNG to monitor systems. Ultimately, the software can be used to avoid downtime or diminished performance as well as the loss of productivity that accompanies these problems.

CA says the software will be more precise and rigorous than current trend and resource-analysis tools and will deliver such alert messages as "There is a 70 percent chance the system will experience a performance bottleneck in 40 minutes." Future versions of Neugents will target data mining, electronic commerce, financial services and other business applications. This version runs on Windows NT and costs \$2,000 per server. For more information, call 516 342-5224 or visit www.cai.com.

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Dun & Bradstreet

Emerging Technology

including job requisition creation and approval, interview-related tasks, hiring decision approval, job offer presentation and, ultimately, the integration of new employees. Employ sports a Web front end and uses e-mail as a workflow vehicle.

"Deploy Solutions has done a phenomenal job of taking a process that is critical to business and managing it from an end-to-end perspective," says Deputat. "It has allowed us to put a tool on managers' desktops that makes it easy for them to generate position requisitions."

Strategic Suites

Although the first wave of strategic HR applications involved an explosion of single-solution extensions that automated specific activities, vendors are now developing multifunction add-on HR suites. Austin-Hayne Corp., for example, a San Mateo, Calif.-based vendor, offers an array of applications for performance management, succession planning and distributed compensation planning. For service businesses, Evolve Software Inc. offers servicesphere, which includes its Resource Manager applications for staffing, scheduling, managing skills and developing organizational capabilities. Oakland, Calif.-based Seeker Software can add to its Web-based Seeker Core modules to address payroll, benefits and managing compensation, skills, performance and training. Other companies, such as Business Engine Software Corp., can draw enterprise supply data from HR systems to drive resource planning systems.

In response to the changing demands, HR professionals' relationship with the IT department has changed as well. State Street's Schoonover says she's had to become more skilled at articulating her department's needs because some of what she's asking for is different from the requests HR has traditionally made—for example, a system to help match job skills with internal skill competencies. At Warner-Lambert, reports Huelsman, the company's reengineering efforts forced HR to realize that the department needed to be much more IT-conscious and also needed to bring IT into the HR community.

HR's new positioning and needs portend interesting times for IT. In the next several years, as it searches for business practices that benefit the bottom line, HR is likely to reach far beyond back-office automation systems toward cutting-edge technology in human capital management. CIOs will need to be ready to provide the benefit of their experience in aligning with the business. **CIO**

Alan S. Kay covers business and consumer technology from San Francisco. He can be reached at ask@well.com.

LEADING

EDGE

Don't Change That Channel—Manage It

INSPIRED BY THE GROWTH in the extranet market, Aventail Corp. has shifted the focus of last year's AventailVPN product and introduced **Aventail ExtraNet Center**, adding security features so that customers can move from a solution for internal communications to one that encompasses external partners. It lets IS manage access to company information by supply chain participants and other partners. The new product also incorporates centralized management as well as application and network integration tools.

From a security standpoint, ExtraNet Center provides encryption and authentication as well as granular access controls so that administrators can carefully define privileges based on user ID, group affiliation or day and time. From an integration standpoint, the software can interface with any IP-based application, including legacy applications, Java, ActiveX, Corba or those from ERP vendors SAP, Baan and PeopleSoft. The price of the client/server bundle is \$7,995. For more information, call 206 215-1111 or visit www.aventail.com.

Play for Work

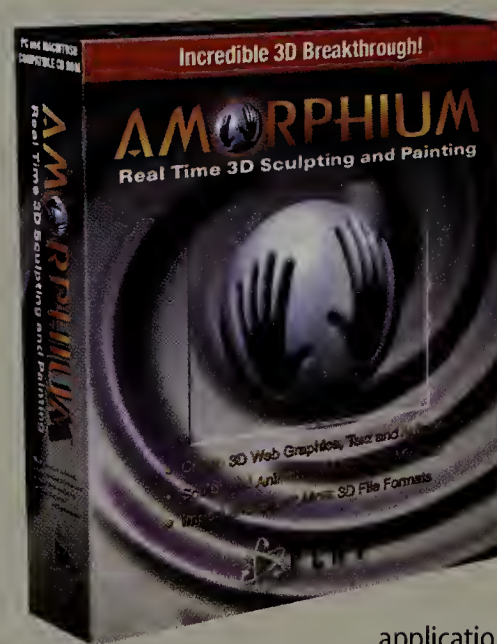
IT'S TOUGH TO BELIEVE a great work tool would come from an organization named Play Inc., but the Rancho Cordova, Calif.-based company's **Amorphium** software may be a boon for product designers or anyone else charged with three-dimensional modeling tasks.

Amorphium is a real-time PC program that lets the user stretch, bend, fold, spindle or mutilate shapes through a simple interactive interface.

Unlike more complicated programs that usually run on powerful workstations, Amorphium requires no wire-frame editing. Features include texture mapping, morphing and 3-D text generation, and built-in tools handle standard design tasks such as rotating the object or moving the light source.

Amorphium supports a variety of standard 3-D or 2-D file formats, so users can swap designs into and out of computer-aided design (CAD)

applications or create Web-ready animation GIFs and virtual reality modeling language (VRML) files. Amorphium costs about \$150 and runs on Microsoft Windows 95, 98, NT 4.0 and Power Macintosh. For more information, call 800 306-7529 or visit www.play.com.

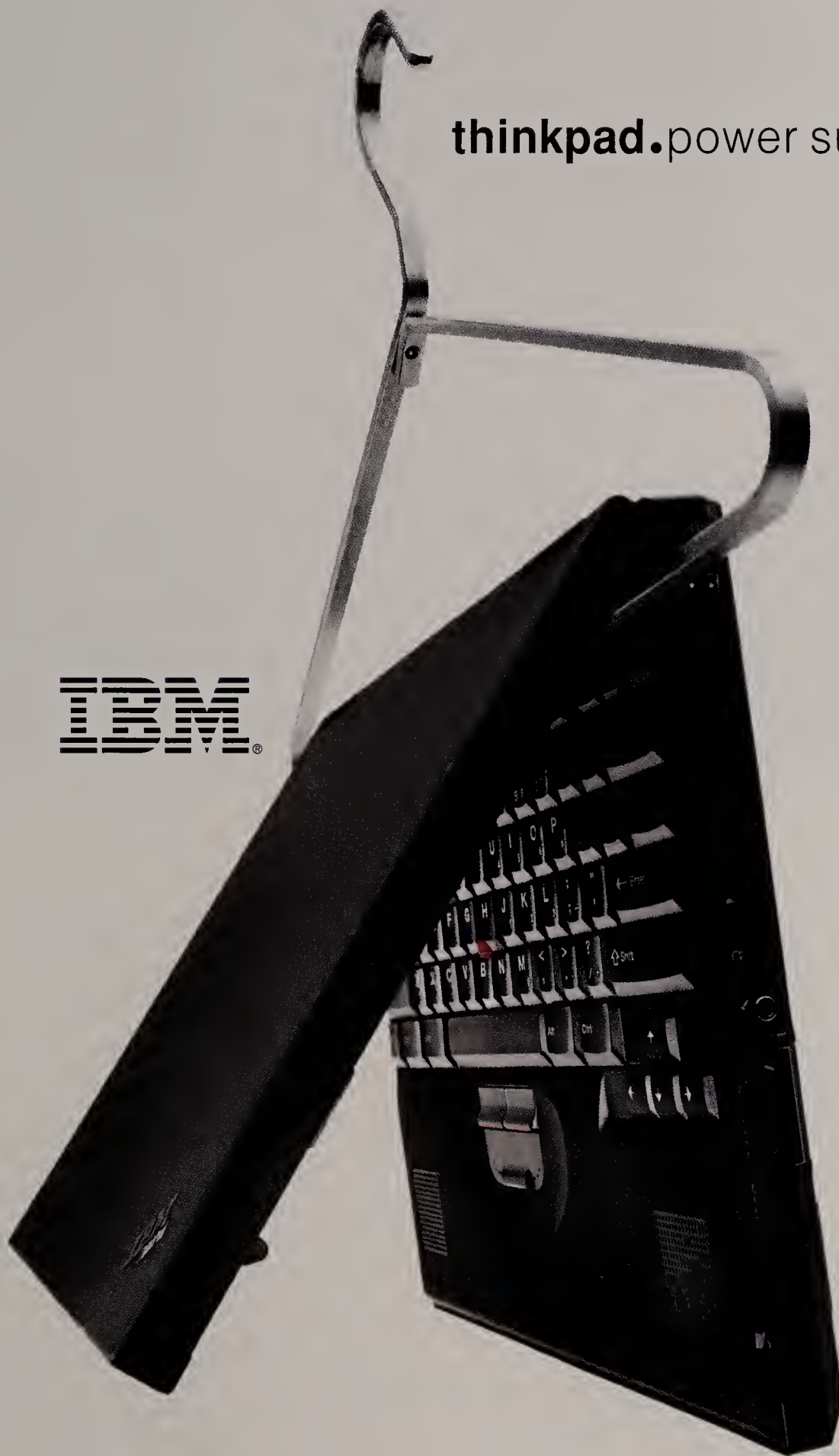




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S E E F A R T H E R

ShopTalk

Wisdom from Pat Wallington as She Retires From Xerox

CIO: What are the signs that the CIO position is maturing?

The simple fact that IT leaders are out of the back office, that CIOs are widely recognized as key executives in many major corporations. I don't know whether this development accelerated the maturation of the position or if it was the other way around. But clearly many CIOs are important business people in their organizations today. That's a big change from when I entered the field.

What's the biggest change?

All the years that we talked about how IT wasn't contributing to the productivity of companies—you don't hear that anymore. What you hear is how it *is* contributing. And [you hear] how the productivity and the gains that American corporations have made couldn't have happened without the information technology that's been put in place. Over the last 5 to 10 years, we've seen business learning how to harvest business benefits from IT and IT people learning how to talk with their business peers—and, in the process, becoming business leaders. At the same time, I know of



Spotlight On:

Patricia Wallington, former corporate vice president and CIO of Xerox Corp. in Stamford, Conn.

- **Line of Business** Retired from Xerox in January 1999
- **Bio** Executive IT positions at Xerox (1989-98), Massachusetts Mutual Life Insurance Co. (1987-89) and Sun Exploration and Production Co. (1984-87); inductee in the Women in Technology International's Hall of Fame (1997); first female president of the Society for Information Management (1992-93)
- **Future Plans** Consulting for Xerox and others; teaching and writing; walking on the beach

a lot of CIOs who are still holding back.

Why would they hold back?

There's far more risk involved in being a business executive than in being a vice president of information management, and it requires a whole new skill set for most IT people: creativity, leadership, relationship-building, balancing multiple objectives. The strictly technical profile of the past doesn't lend itself to those qualities. The leaders of IT need to continue growing and developing. A good proportion of them have executive skills, and some of them are still coming along.

Obviously, not every organization moves through these changes at the same pace. The Industrial Revolution didn't happen in a month, and I think the same

make strategic decisions for the company. And that means building relationships and credibility. Continually reinforce your soft skills because in IT we can't give value by ourselves; we can give value only with the business. So we've got to be able to do tough things and engage tough issues in a way that leaves people whole. The CIOs I see who don't make it don't know how to do that. Every time they raise a conflict, they feel they get beat up and lose. So they stop raising conflicts, and then they don't make progress or deliver business value over the long term.

Is the day coming when the CIO is no longer perceived as one of the organization's top technologists?

Well, it's interesting. We used to say, "You have to educate the business." I've always thought that was kind of arrogant. I believe we need to educate ourselves [about the business and the industry it's a part of]. That is not to say we should neglect the technical aspects of IT. Having a skilled staff, delivering technical solutions and meeting high levels of service quality—all those things are, and always will be, absolutely necessary. But if they're going to succeed in years to come, CIOs will definitely need to layer business leadership attributes on top of the fundamentals.

—David Pearson

will be true of the Information Age.

What can CIOs do, day to day, to hasten their "arrival" as respected business leaders?

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